



Ministry of  
Housing  
Local Planning  
Policy Branch

# Mobile Home Projects

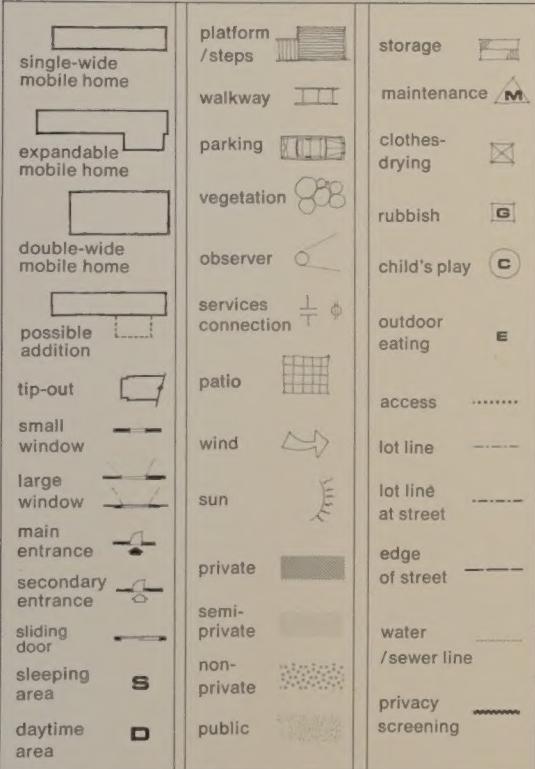
## Site Planning Guidelines



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## Parts I through Parts V



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# MOBILE HOME PROJECTS

Site Planning Guidelines

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Ontario

Ministry of  
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Policy Branch

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## PREFACE

3

The question of how to ensure a suitable residential environment for mobile homes has confronted municipalities for many years. While mobile homes are now recognized as an alternative form of permanent housing, their apparent differences from most conventionally-built dwellings have posed a series of problems which municipalities have found difficult to resolve.

This manual addresses innumerable questions involved in the site planning and design of mobile home projects. Many general guidelines are suggested and a few specific standards recommended. The essence of the *Guidelines* is the reasoning behind them, for it is only with a clear understanding of the rationale that the *intent* can be applied in a variety of different situations.

The major objective has been to develop an effective planning tool which can help in the creation of better residential environments for mobile home residents in Ontario communities.

This manual is directed primarily to municipal officials, including planners, who are responsible for the design or evaluation of proposals for mobile home projects. Others with different interests in the mobile home environment may also find it useful. However, developers who intend to seek approval of a proposed project

for funding purposes should not assume that use of the *Guidelines* implies such approval. For assistance from Central Mortgage and Housing Corporation, for example, direct consultation should take place with the local C.M.H.C. office.

This manual is part of a broader study of mobile homes in Ontario by the Special Studies Section, Local Planning Policy Branch. Other parts, including previous publications and an unpublished survey of local officials and residents of mobile home parks in the province, have provided valuable input to the *Guidelines*.

More recently a study of the acoustical characteristics of mobile homes has been conducted for the Ministry by Valcoustics Canada Ltd. with very excellent co-operation of technical representatives of the Canadian Mobile Home Association. The study, which forms Appendix C of this publication, is the first such investigation done to our knowledge of mobile homes. It has permitted comparisons to be made between mobile homes and conventionally-built housing.

Tests have shown that mobile homes being built at the present time in Ontario have only marginal differences acoustically from wood frame housing with

wood or metal siding although older mobile homes differ substantially.

As a result, mobile homes throughout the *Guidelines* have been treated for most purposes as equivalent in acoustical characteristics to a house of wood frame construction.

The *Guidelines* were prepared by the Special Studies Section, with Karen V. Jones as project planner. A significant contribution to Part VI was made by John G. Williams Associates Ltd. and Williams Smith Associates Ltd., Toronto urban design consultants, through their development of the project designs.

The staff wishes to acknowledge the invaluable assistance given by other government agencies, individuals and, in particular, members of the Canadian Mobile Home Association and a group of municipal planners called together by the Municipal Liaison Committee.

It is recognized that because of changes in technology, characteristics of users and perhaps more importantly through practical use of the *Guidelines* revisions to this publication will be desirable. Written comments to the Local Planning Policy Branch will be appreciated and acknowledged.

G. Keith Bain  
Director  
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Policy Branch

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In planning a housing project, the designer relates physical components such as roads and buildings to form a framework for human activity on a specific piece of land. The aim is to produce an environment that functions effectively and is satisfying for living.

The general approach to site design is the same for all types of housing projects whether they comprise single-family detached homes, town houses, apartments or mobile homes. The specific approach varies, however, because of the particular characteristics of different housing types. The focus here is on aspects of site planning which are particularly relevant to mobile homes rather than on methods which are similar for other dwelling types.

Site planning for any housing development, including a mobile home project, should recognize the planning framework for the community as embodied in such instruments as the official plan and zoning by-law.

### Scope

The scope of the *Guidelines* should be clearly understood, in terms of what is excluded as well as what is included.

Mobile homes, unlike trailers or recreation vehicles are part of the housing stock. This manual is concerned with *mobile homes*, which are dwelling units used for permanent occupancy. Travel trailers are not considered since they are recreational vehicles for transient use.

The *Guidelines* relate to site planning for mobile home projects, including both parks and subdivisions. The focus is on projects with mobile homes only — no attempt is made to cover projects containing mobile homes within a mix of housing types.

*This document is concerned primarily with projects for general housing purposes, not retirement or recreational communities.* The guidelines given within may need to be modified for projects with specialized characteristics. Individual study should be made of those projects which are not developed as housing for the general population and in many instances, different standards may be desirable than are proposed in this publication.

While it is recognized that there have been changes in mobile homes in recent years and that more changes can be expected in the future, the *Guidelines* are concerned with the kinds of mobile homes now in use in Ontario. These include three types: single-wide, expandable and double-wide.

Various models of each type of mobile home are manufactured. Their interior layouts have specific features relevant to site planning. Typical models have been selected for illustrative purposes in the *Guidelines*. Their precise dimensions are not a matter of major concern since the purpose is to demonstrate a site planning approach which is equally valid for other models, regardless of size.

In 1976, almost two-thirds of the domestic mobile

home shipments to Ontario were single-wide units. The remaining one-third were double-wides which now represent a much larger percentage of mobile home production than they did a few years earlier.

Mobile homes are one alternative form of housing. Whether any particular form of housing (single family, multi-family, high-rise or low-rise) is to be encouraged in a municipality is a choice that is made locally. In this context, the *Guidelines* are intended as a resource document for mobile home projects of particular value to both developers and municipal officials.

In other words the content of this document should be regarded as advisory only and in no sense should the standards be considered as mandatory. Modifications may be needed in many cases to suit local circumstances.

### Format

Part I of the *Guidelines* identifies and describes selected characteristics of mobile homes which not only affect site planning but also differ from most conventionally-built housing.

Parts II through V are concerned with the site planning of a mobile home project at different levels. First, general project guidelines are discussed in Part II. Issues relating to site planning on individual plots or lots are considered in Part III. Parts IV and V examine groups of mobile homes and larger segments of the project, respectively. Finally, in Part VI some total project designs are shown.



## CHARACTERISTICS OF MOBILE HOMES WHICH INFLUENCE SITE PLANNING

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## CHARACTERISTICS OF MOBILE HOMES WHICH INFLUENCE SITE PLANNING

In siting a group of buildings the designer has to consider physical qualities of each building and how they interrelate with each other and their surroundings. Efficiency, utilization and appearance are important factors, which include

- how the buildings adapt to the topography and landscape.
- how the totally enclosed spaces (the buildings) and partially or completely open spaces (the lots, streets, etc.) interact because of the way they are used
- how the buildings and intervening spaces appear — are they attractive and do they create a pleasant sense of proportion

This means that the physical characteristics of a single-family detached dwelling which significantly affect site planning and design are

- the size and shape,
- the use of interior space,
- the location of exterior doors and windows,
- details of construction which are relative to the performance or appearance of the building.
- the visual impact

These are the characteristics which are stressed in the discussion of mobile homes which follows

No attempt has been made to cover all features of mobile homes such as detailed interior layouts, cost or financing

These guidelines only discuss the product known and marketed as mobile homes. The reader should be aware that there are similarities between mobile homes and other manufactured housing — notably sectional and modular homes

As with any housing officials are cautioned to be aware of details of mobile homes to be accommodated in a project — such as their appearance, standards of construction and the location of utility connections

The mobile home industry is continually changing its product. In time general characteristics may substantially change — the use of heavier construction materials, adjustments to roof lines or the use of multiple sections are some possibilities

## A. Production, Delivery and Placement

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### Factory-Built

In contrast to most conventional single-family detached housing, mobile homes are not constructed on-site. They are a factory-built product with almost all construction, including finishing materials, completed during the assembly process.

They are assembled on a steel-framed chassis by which they are hauled to the site.

### Marketing

Mobile homes are usually marketed without land. A support or foundation system is not part of the manufactured mobile home, nor are steps or platforms at entrances

### Transport

Running gear and a hitch, or hauling device, are attached to the chassis at the factory which permits the mobile home to be transported on highways from the factory to the site sometimes via a retail sales lot.

Once the mobile home reaches the site the hitch and running gear can be removed. They can also be reattached so that the mobile home could be moved to a new site

## B. Physical Characteristics

### Dimensions

The method of production and delivery produces some conformity between homes.

There are restrictions on the dimensions of transportable loads on highways to ensure traffic safety. These are

- width — up to 4.3 m (14 ft.)\*
- length — up to 21.3 m (70 ft) including the hitch which is about 1.2 m (4 ft.)
- height — up to 4.1 m (13 ft. 6 in) including the undercarriage or running gear.

Mobile homes share physical characteristics, which in part relate to the method of delivery. In addition they are similar in the methods and materials with which they are constructed

There have been changes recently in some mobile homes constructed in Ontario in order to meet building code regulations and also to meet federal financing requirements. It is important that officials keep abreast of the current building practices in the industry

### Construction

Mobile homes are wood frame buildings constructed of light-weight materials that will minimize weight and withstand the stresses of transportation.

It is common for the exterior finish to be aluminum siding although occasionally some paneling imitating brick, stucco or stone is used. Because the materials generally are light in weight and not dense they permit slightly greater levels of sound transmission of airborne noise in comparison with conventional homes of wood frame construction with wood or metal siding, and significantly more than those with brick veneer. For a report on the acoustical performance of newly-constructed mobile homes see Appendix C — *Noise and the Mobile Home*.

Mobile homes are one-storey in height with flat or slightly pitched roofs

Mobile homes have few protrusions and recesses on exterior walls because

- the building envelope is kept as close as possible to the restrictions on dimensions.

- the walls are not thick enough to permit significant recessing of windows and doors;
- door and window frames are constructed of thin materials such as aluminum

### Standards of Construction

At the present time mobile homes are constructed to meet different standards. In Ontario the regulations of *The Building Code* apply to all mobile homes newly-constructed and placed on a foundation. If a new mobile home bears the CSA Z240 label and was constructed in Ontario it can be assumed that the mobile home complies with *The Code*

They may also meet standards necessary to receive financing under the National Housing Act

Older mobile homes, used mobile homes or those constructed outside Ontario, may or may not meet the construction standards within this province

### Interior Space

The majority of mobile homes sold in Ontario have less floor area than a typical bungalow \*\*

Rooms and storage spaces are generally small. The manufacturing/transport process does not permit an attic. Usually no basement is incorporated in the foundation although there have been some erected in this manner recently

\*Where only non-metric standards or dimensions are available they have been rounded to the nearest 0.1 m or 0.1 m<sup>2</sup>

\*\*A single-wide type of mobile home compared with a small conventionally-built 3-bedroom bungalow  
 Special Studies Section, Local Planning Policy Branch, *Mobile Homes in Ontario: Construction and Costs: Summary Based on a Report by Peter Barnard Associates* (Toronto: Ontario Ministry of Treasury, Economics and Intergovernmental Affairs, 1973), p. 6

## C. Types of Mobile Homes

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There are some consistencies in present mobile home designs which the following section "C. Types of Mobile Homes" will clarify

### Interior Layout

There are similarities in the arrangement of interior rooms and spaces. The daytime living areas — the living and dining rooms and kitchen — are usually at the hitch end of the home with bedrooms at the other end.

Occasionally variations occur; some mobile homes have a bedroom at the hitch end

### Entrances

Usually the main entrance is in a similar location in mobile homes. When facing from the hitch end the main door is on the left side towards the hitch, although there are some recent exceptions

Other, or secondary door(s), vary with the particular mobile home

### Windows

Mobile homes usually have at least one large window within daytime areas as is common to other single-family housing

Smaller windows surround the home

At this time there are three basic types of mobile homes produced by the industry and many *models* of each type available from different mobile home manufacturers

The three basic types of mobile homes are:

- the single-wide
- the expandable and
- the double-wide

These descriptive names do much to explain the essential characteristics which different *models* of each of the three types have in common — the width, length and form — which largely determine the visual outline and impact of mobile homes

Several models have been chosen for illustration from among those recently available in Ontario

These models of homes are used throughout the *Guidelines* for illustration of site planning objectives. The objectives would also apply to models which are not illustrated

Floor plans show the shape of the mobile home and are divided into sleeping **S** and daytime **D** areas. Daytime areas contain living, dining and kitchen spaces. Sleeping areas contain bedrooms and bathrooms

Dividing the plans into areas in this way is convenient because variations may occur in precise layouts which do not alter the purpose of the area. The buyer of a new mobile home is usually offered a range of options for the interior layout. Also the overall dimensions, interior room sizes and detailed layouts of models are often altered by manufacturers.

The dimensions used here and throughout the *Guidelines* refer to actual measurements not nominal sizes often used by the industry which include the length of the hitch.

## 1. The Single-Wide Mobile Home

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The single-wide mobile home has an elongated, rectangular plan which results in an overall building form of similar impact.

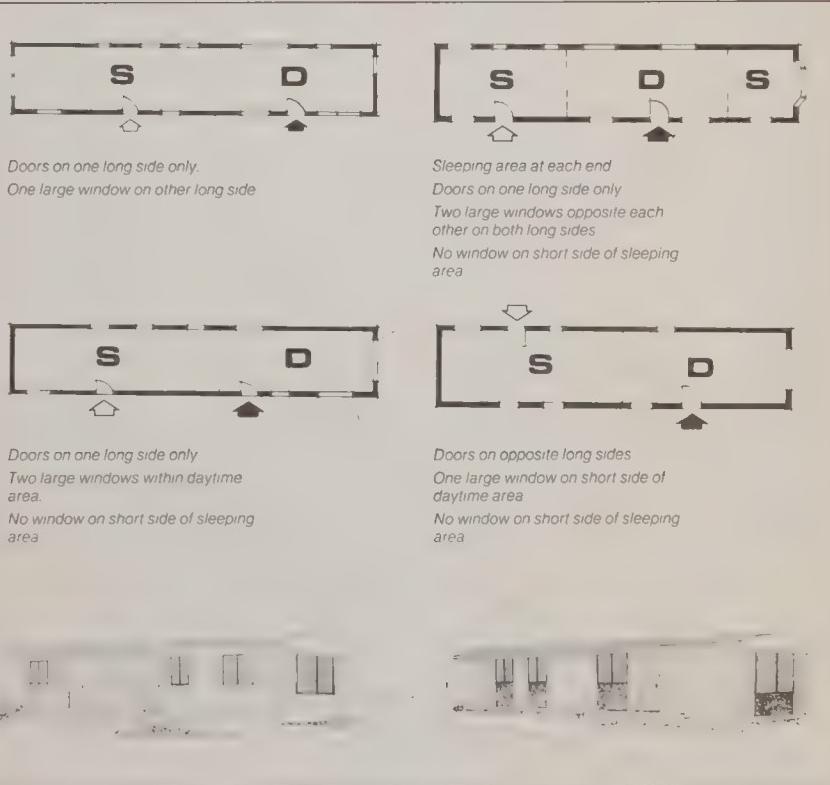
Single-wide mobile homes currently manufactured in Ontario vary in size from 3.7 m (12 ft) to 4.3 m (14 ft) in width by 14.6 m (48 ft.) to 20.1 m (66 ft.) in length. In 1976 the marketing trend was to wider and longer homes. At present the most popular size is 4.3 m (14 ft) by 19.5 m (64 ft.)

The width to length ratio is about 1 to 5. The elongated shape creates a large area of perimeter wall relative to the total floor area.

The rooms in the single-wide home are in a linear arrangement off a corridor which runs along one exterior wall. The corridor may be on either side but it is always single-loaded (rooms off one side only).

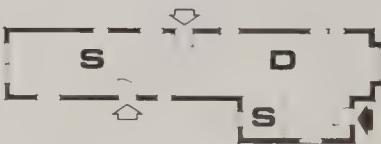
There are two or three exterior entrances. While the main entrance is generally fixed in location, the other door(s) may be on either long side. The main entrance door opens directly into daytime living areas.

At present single-wide homes are the most popular type of mobile home sold in Ontario. (See Appendix B)





*Expansion and main door recessed  
Secondary door on same side as  
expansion  
One large window on other long side*



*Larger expansion contains both  
daytime and sleeping areas  
Tip-out in daytime area  
Three doors — one on each long side  
and on one end within expansion  
One large window on side with main  
door*



An expandable mobile home is a factory-built unit transported in one load from the factory to the site. Small portions are projected, or tipped out from the basic unit when sited. Larger sections, which have been transported within the basic unit are telescoped or pulled out on siting and must rest on supports.

Pull-outs or tip-outs add some extra volume to a room while expanded portions may substantially increase the size of a room or add one or more rooms. Obviously then, the living area in an expandable mobile home tends to be greater than in a single-wide home of the same basic length and width.

Sometimes the main entrance is incorporated in the expanded portion.

The interior layout of expandable mobile homes will vary with different models but becomes semi-linear, with perhaps a portion of corridor double-loaded (rooms off both sides).

The visual form will vary depending on the size and location of the expansion.

Expandable mobile homes provide variations in configuration not obtainable from either single-wide or double-wide homes. However, the popularity of expandable mobile homes does not appear to be great.

A single-wide mobile home to which an addition is constructed on the site is not termed an expandable although the resultant configuration and volume could be the same.

The configurations used in these guidelines express both cases

### 3. The Double-Wide Mobile Home

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Double-wide mobile homes are composed of two sections separately transported and joined together on the site.

While the overall width is greater than that of the other two types of mobile homes, the length tends to be shorter.

Double-wide homes currently manufactured in Ontario are in the range of 6.7 m (22 ft) to 7.3 m (24 ft) wide and from 11 m (36 ft) to 18.3 m (60 ft) in length.

Double-wide homes have a width to length ratio which is about 1 to 2. They closely resemble small, conventional, one storey houses or bungalows.

Because of the width of the home it is common for rooms to be on both sides of a corridor.

Some models have space that can be used for a staircase to a basement.

Locating the main entrance on a short side is a recent innovation in the design of some double-wide units.

While the percentage of double-wide mobile homes sold in Ontario has increased in recent years their number still remains small. (See Appendix B)



## PLANNING THE PROJECT

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## PLANNING THE PROJECT

### A. General Evaluation of a Proposed Project 1. General Concept of the Project

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This part of the *Guidelines* focuses on the mobile home project in its entirety. It is a guide to the general planning and design of mobile home projects of particular use to officials in municipalities — especially those with limited professional planning staff.

Developers, with the assistance of professional advisors — engineers, architects, landscape architects and planners — should approach the formulation of such projects in a manner similar to that of any housing project.

The issues discussed relate to all projects containing mobile homes, regardless of the types or mixes of types of mobile homes which they contain.

The design of any housing project should reflect the constraints imposed by the physical nature of the site and other unusual characteristics as well. In a mobile home project there are two distinct factors — the ownership of the land and the characteristics of residents.

#### Land Ownership

A mobile home project in Ontario could be one of two basic types, a park or subdivision. It is possible that there could be other variations, such as co-operatives.

At this time almost all mobile home developments in Ontario are of the first category — the mobile home park.

#### Park

The park comprises one parcel of land which is under single ownership and has not been subdivided under *The Planning Act of Ontario*. Usually the owner retains title to all land within the park's boundaries including streets and parkland. The individual lots or plots on which the mobile homes are sited are rented from the owner. In most instances the mobile home is owned by the occupant. It is common for the owner of the park to be responsible for maintenance of the development including streets and open areas, as well as provision of some services such as garbage collection and snow removal. Water supply and sewage disposal are customarily the owner's responsibility as well. Any such system must be in accordance with provincial requirements.

There is usually a part or full-time manager (he may be the owner) who oversees the operations of the park (much like the manager of an apartment building). In some cases management assumes responsibility for some maintenance on lots, grass cutting in particular

#### Subdivision

In a mobile home subdivision the lots are subdivided and registered under *The Planning Act* of Ontario and sold to the individual.

The mobile homes are normally owned by their occupant although occasionally the occupant may rent the unit from the lot owner.

Land within the street right-of-way and for public open space is owned by the municipality which is responsible for the maintenance of streets and services as in any subdivision.

#### Residents

It has been found in studies in Canada and the United States that mobile home accommodation most generally appeals to small families, that is, to young parents with a few small children or to older segments of the population who no longer need sizable accommodation.

Some projects are particularly oriented as retirement or recreation communities. In addition, some projects may be established to service a resource industry, such as mining.

Management policies in mobile home projects may influence household characteristics. For example, some parks aim to attract retirement couples rather than families with young children.

These characteristics of the inhabitants and their socio-economic objectives can influence the design of a mobile home project. They affect the use of space within the project — on individual lots as well as within communal areas.

## 2. General Municipal Objectives

### Implications for Planning

Differences in land ownership may exert a major influence on project design, even though it is evident in only a few key areas, such as development standards, street layout and location of water and sewer lines.

The social characteristics of residents have a major influence on community services. For example, a retirement project increases the need for adequate geriatric health and emergency services while a project with many small children will require community sponsored child-care, pre-elementary and early elementary school services. Such impacts on the community are the same for any housing project, whether it is comprised of mobile homes or other dwelling types. Impact is relative to the number and ages of people living in a project.

The social characteristics of a project's residents should also be reflected in the recreational and social facilities that are provided in the community as well as those included in the project. And although some recreational facilities may be provided in mobile home parks they can not be expected to totally fill the needs of the residents.

## 3. General Approach to Evaluation

The main objective of the project should be to establish a sound housing project within the framework of local plans for development and be compatible with municipal, regional and provincial policies.

Therefore, the specific issues relating to any proposed project should be judged on the basis of growth policies for the general region and on detailed planning for a precise location.

Since the housing requirements and standards of development differ throughout the province, the solutions cannot be identical. *Each proposal should be judged on the basis of local need and criteria.* For example, parking requirements may differ within urban areas, and between areas where public transit is or is not available.

A mobile home project should be comparable and compatible with other single-family housing projects of similar size and density provided similar standards of development are followed.

As with any housing project the feasibility of the project and its ownership/management policies should be clearly established and the market for the particular type of housing explored. Officials should understand the implications of new housing stock and assure themselves that the project will be accepted as an integral part of the community.

The selected site should be adequate for a housing project with respect to its location and physical characteristics.

Hazardous lands, such as land with insufficient soil cover or subject to flooding, or resource areas such as prime agricultural land or water recharge areas would be excluded because they are not suitable for any housing development.

In concept, the project should be planned in total. If the project is to be developed in stages, however, detailed site planning of areas for expansion would not have to be done initially.

### The Planning Act

Officials and planning advisors must be aware of their responsibility to prospective residents and to the larger community. The tools of sound planning such as the official plan and zoning by-laws should be properly developed and used.

Under Section 35 (c) of *The Planning Act*, if there is to be more than one mobile home on a single parcel of land the land must be specifically zoned for this purpose.

## B. General Planning and Design

### 1. Location Within the Community

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#### 4. Permanency

##### **Development Agreements**

Particular attention should be paid to the opportunities for agreements between the municipality and developer over details of buildings and the site available through *The Planning Act*.

##### **Maintenance Agreements**

The maintenance of physical features and services is important in any housing project. It is vital that the municipality be assured that the responsibility for maintenance is established in mobile home parks. Proper maintenance should be controlled through agreements and appropriate local by-laws that are enforceable.

Although mobile homes are potentially mobile, other aspects of the project such as roads and utilities and the provision of community services are not. It cannot be stressed too strongly that a mobile home project should be considered a permanent feature.

Perhaps only in a resource-oriented project and under special circumstances could a mobile home project be developed on a temporary basis.

Mobile home projects should be subject to the locational requirements of any similar single-family housing built to comparable densities within a municipality.

The provision of municipal services and the probability and consequences of expansion of both the project and the community should be included in any review.

The concept of the project and the anticipated social characteristics of residents may have some bearing on the location. For example, proximity to community schools may be critical for families with young children but not for the retired. The role of public transportation will obviously be different for working families who need home-to-work transportation at peak hours and for retirement couples who use such services for shopping or entertainment trips.

Adjacent land uses should be those appropriate for other single-family housing such as land used for other residential or recreational purposes.

A project should not be located near noise generators such as race tracks, railway tracks, arterial roads, flight paths, etc. Further, because of the low visual profile of mobile homes, developments of greatly different scale, highrise apartments, for instance, are inappropriate neighbours.

## **2. Development Standards**

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The level of acceptability of development standards for width of roads, provision of sidewalks, curbs and gutters, methods of storm drainage, utilities, etc., cannot be expected to be uniform across the province. Differences exist between urban areas of varying sizes, such as a city and village, for example. Differences in standards also exist between parts of the province, the north and south in particular.

It is recommended that the standards of development for a mobile home project be similar to those for any other new housing that would be acceptable in the community.

It is also recommended that municipal representatives study the significance of adapting urban development standards which would enable mobile homes to be an economically viable form of housing and be compatible with other new community housing.\*

The suggestion for similar standards applies to all mobile home projects, including parks where it is common for roads and utilities to be retained under private ownership.

There might be exceptions which would be acceptable nevertheless. For instance, road widths are often determined by the type of equipment used for clearing snow. The equipment used in some parks may need less clearance than that used by a municipality. Thus a narrower road may be satisfactory.

### **Parking**

Parking requirements should conform to those for new single-family detached housing in the area.

The amount of parking accommodation needed for residents and visitors in mobile home projects may vary from one project to another, but generally, two parking spaces per lot will be required.

Local patterns of vehicular ownership will depend on such factors as the availability of public transit, socio-economic characteristics of residents, the location of the project within the province and whether it is centrally located in the community or on the fringe of urban development.

The manner in which parking is accommodated is often directly relevant to the design standards established for streets in the project, particularly whether the roadway includes parking lanes as well as traffic lanes.

Both visitors' and residents' parking must be provided in a mobile home project. It can be combined or provided in separate parking areas, or some of each.

### **Streets**

Mobile home subdivisions have the traditional, legal street right-of-way. Mobile home parks usually do not because the land, including streets, is under single ownership. There will be 'lot' boundaries near the street, however.

### **Sidewalks**

It is important to plan the routes for pedestrians so there is a minimum of danger. Where walkways or sidewalks are used they should be clearly identifiable and wide enough to accommodate more than one person.

### **Utilities**

It is especially important that the utilities which serve a mobile home project be adequate and properly designed. The appropriate piping and wiring systems for water, sewage disposal, storm drainage, gas, electricity, telephone, and in some areas cable tele-

vision, should be equal in performance to those recommended for similar housing projects.

### **Sewage Disposal**

Proper sewer servicing is a requirement of any development. There are alternative methods which could be used in a mobile home project which include:

- connection to municipal systems,
- establishment of project-wide servicing (e.g. lagoons),
- establishment of smaller systems (e.g. septic tanks),
- some combination of the above.

Any servicing should be adequate to meet the needs of the residents and to function properly to avoid health hazards and environmental damage. Any system must meet provincial and local requirements.

A sewage treatment area (e.g. lagoon) should be adequately separated from residences, fenced and screened or buffered if it is likely to be unsightly or hazardous.

### **Water Supply**

The water supply to a mobile home project must meet provincial and local requirements whether it is supplied as part of a municipal system, or from a private well(s).

### **Storm Drainage**

The type of system used to dispose of surface run-off should be at least equal to the standards acceptable for other new housing developments in the area.

\*See Programs Section, Local Planning Policy Branch, *Urban Development Standards. A Demonstration of the Potential for Reducing Costs* (Toronto: Ontario Ministry of Housing 1976) for savings which can be achieved through appropriate development standards.

Where drainage is by ditches, rather than an underground system, the ditches should be designed so that the total project is free of flooding and the accumulation does not harm surrounding areas.

#### Wiring

It is recommended that telephone, television and electrical cables be underground where possible. Overhead wiring is particularly prominent in a project with a uniformly low skyline. If overhead wiring is used homes should be serviced from the rear of lots, or interior of blocks.

A master TV antenna will eliminate the need for individual antennas which can be unsightly.

#### Location and Access

The type of project can have an effect on the way in which utility systems are designed.

Mobile home subdivisions are serviced by patterns similar to any other subdivision. Utilities are most often contained within the street right-of-way with lines which run to homes contained within the boundaries of the lots. Alternatives which include servicing lots from the rear or mid-block within a service easement require that the utility company representatives have permanent access to the lines, so an accessway has to be provided.

In projects such as parks where the land is not under individual ownership, utility lines may traverse the boundaries of lots and could, theoretically, be located anywhere. However, the utilities should be designed and laid out so they can be maintained and company representatives and officials can have reasonable access.

Adequate social, professional and business services such as medical care, police and fire protection, education, retail outlets, structures or areas to supplement the housing needs of residents should be a consideration in any housing project evaluation.

The residents of mobile home projects should have access to facilities and services at least equivalent to those available to the residents of any similar housing project. Some facilities and services will be required of the community, while others can be included in the project.

Although some small-scale services are often included in mobile home parks, the community must provide schools, churches, hospitals, large stores, parks, etc.

One of the disadvantages of extensive facilities within a housing project is the tendency toward segregation of the project from the total community by not furthering participation within community programs.

#### Commercial Establishments

Small establishments such as hairdressers or stores selling convenience-type goods may be provided in a mobile home park for the benefit of residents. The need for such services depends on factors such as the size of the project, available services nearby and public transportation.

A mobile home project is not a suitable place for the display and sale of mobile home units unless they are properly sited and ready for occupancy. Any commercial area devoted to the sale of mobile homes or their accessories should be located in normal commercially zoned districts.

#### Laundry

Laundry facilities have, by tradition, been provided in mobile home parks. However, newer models of mobile homes are larger and are usually furnished with space and connections for washers and dryers so the need for laundry facilities is diminishing to that of any residential neighbourhood.

#### Storage

Because of space limitations within mobile homes the provision of additional storage space has become a necessary part of mobile home projects. Space adjacent or near to each home appropriate for the enclosed storage of items such as garden or play equipment should be available either in individual or group storage structures.

Central storage of larger items, such as residents' boats or trailers, is sometimes provided in a park (where maintenance and operation are the responsibility of management). Such facilities could also accommodate equipment which is owned and operated by management.

Central storage facilities might be provided in a subdivision if the responsibility for maintenance can be clearly established.

All storage areas which might be eyesores should be screened.

#### Police/Fire Protection

In mobile home subdivisions normal police and fire protection will prevail. In mobile home parks where streets are private local officials should ensure that residents are provided with the same degree of protection. If necessary, local by-laws should be passed to allow police the right to enforce traffic regulations.

#### 4. Open Space/Recreation

It is particularly important that all mobile home projects have adequate standards of protection against fire.\*

In addition, addresses should be sufficiently distinct that drivers of emergency vehicles will have no difficulty in finding their destination.

##### **Mail Delivery**

In some mobile home projects mail is delivered to private boxes rather than to individual homes. In such cases the location should be as generally convenient as possible, perhaps near a community centre.

If mobile home projects are to be treated in a manner similar to other single-family housing, mail delivery should be on the same basis as to other homes in the community.

The need for open space with parkland and recreational areas is as important for mobile home residents as for residents of other housing forms. Because of space limitations in mobile homes the amount of open space needed for residents is at least equal to, and probably greater than that required for similar housing in a municipality.

Open space for the use of project residents only is commonly provided within mobile home park boundaries; the maintenance of the areas being the responsibility of management.

Open space or parkland should benefit as many residents as possible. Thought should be given to pedestrian access: how open areas can be linked together and how views into such areas can be utilized from as many lots as possible.

For a mobile home subdivision a municipality may require that at least 5% of the land be conveyed to the municipality for public park purposes. This can be conditional to any subdivision approval.

In order to provide equality to mobile home park residents, the amount of open space/parkland available to them should be at least equal to that provided in a mobile home subdivision.

The municipality and the project developer must establish a reasonable balance of public and private open space in accordance with the need which the park generates and the availability of existing open space in the community.

##### **Types of Recreational Facilities**

Although it is difficult to recommend the precise facilities that should be provided they should relate to the characteristics of the residents.

Family-oriented facilities might include playgrounds, hockey rinks, ball courts, and sled or toboggan runs. Elderly couples probably enjoy shuffleboards, croquet greens and nature trails, while a wider range of people would participate in swimming, boating, golfing and snowshoeing.

The amount of space provided for recreation should not be so limited that a change in social characteristics would find facilities lacking such as a change from retirement-age families to families with young children.

Ideally the space provided should include open space which is in a natural state as well as space for specific outdoor activities. In family-oriented projects it can be expected that certain areas will be adapted for informal play. For example, a relatively flat, open area will attract children wanting to play softball or football.

It should be borne in mind that children will naturally play throughout a housing site, not just in designated areas. Some channelling of activities should be possible through the provision of suitable surfaces at strategic locations.

Indoor recreational facilities or a community centre are particularly important in mobile home projects because the homes are small and the space for group activities indoors is limited. Such indoor facilities are particularly important in cold climates for meetings, workshops and club activities.

\*Insurers Advisory Organization. *Improving the Safety of Mobile Homes* (Toronto) Insurers Advisory Organization Sept 1976 p. 36

## 5. Road Access and Integration

Although a mobile home project should be accessible from a major arterial road, it should not be located adjacent to a heavily travelled road. Such a location is unsuitable for any single-family housing project.

The streets in a mobile home park usually remain under private ownership and often are not planned to integrate with other local streets. There is no through traffic. There are different implications with policies of integration and non-integration.

An integrated system makes the project clearly a part of the larger community. Access to, and identification of streets is easier because they can be approached from various directions and the street pattern, naming and numbering system will be familiar.

Non-integration of the street system tends to separate the project, its residents, and facilities from the larger community. The responsibility for street maintenance and snow-clearance occurs within clearly defined boundaries.

Further, non-integration strengthens the identification of the total project because of its separation but identification of parts of the project is more difficult for strangers and emergency vehicles because the street patterns and names are not readily known.

There can be conflict between project and non-project traffic at the points of access, unless they are carefully planned. More traffic is generated at these points because access points are limited in number. Such problems can be compensated for in the street design. For example, a left-turn lane can be provided outside the project entrance and a median strip can divide the flows of traffic within the project.

Within the project there should be the usual hierarchical system of collector streets, local streets, etc. There should be no differences caused by land ownership.

## 6. The Character of the Site

A study in detail of the physical characteristics of a site will assist in the development of a plan which incorporates natural characteristics. The land's forms and features, topography and vegetation should be used in the project's design.

While the easiest site to plan for residential development is a gently sloping one where the soil is adequate to ensure proper drainage and run-off, many sites with varying topography or ground formation can serve equally well. In fact a site with variation in form provides more interest throughout the project as a whole and helps to identify different areas. Importantly, it enhances individual identification of homes.

In all cases the variety which exists in topography, vegetation, etc., should be incorporated in the design. A site with a distinct character will prove to be more attractive and more likely to maintain its 'value' over the years.

It is particularly important for a mobile home project site to have physical variations which help to alleviate the sameness and repetitiveness inherent in a project of dwellings of similar scale and appearance.

## 7. Features to be Preserved

A detailed analysis of the natural features of the site involves those characteristics that are to be incorporated in the design of the project. These include:

ground formation

- contours
- rock outcrops
- slopes
- depressions, etc.

vegetation

- ground cover
- trees
- shrubs and bushes
- wild flowers, etc

pleasant views and vistas

- within the site
- at a distance

Other possible features of the site to consider for preservation are interesting structures (buildings, fences, etc.)

The space and structural character of existing buildings should be analysed to determine whether they can be incorporated in the project for the same use or can be converted to some other use.

Because a new mobile home project has small, single-storey homes, an older building of a larger scale and height may provide an interesting contrast.

## 8. Project Focus

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It is possible to create a focal point, or points, within a development by highlighting natural or man-made features of the site. Centering attention on some feature within a development can bring a sense of identity and cohesion to the general form. Natural features include a body of water, such as a pond, an exceptional group of trees, a steep rise in ground, or parkland. Man-made features include a community recreation centre or an older building.

Such focal points have particular visual interest or are important as activity centres.

## 9. Landscaping

Natural topography and vegetation do much to determine the extent to which additional landscaping is necessary and the form it should take.

Additional planting should be harmonious with the existing vegetation. It should be selected for the particular locality, with due regard to soil type, terrain, climate and water supply.

Seldom should large-scale tree clearing be undertaken.

In a survey of selected mobile home park residents in Ontario it was found that the presence of trees was one of the most important reasons for residents choosing their particular lot.\*

If mature trees are not in sufficient supply throughout the site, a program to plant new trees should be undertaken. Consideration should be given to the speed and spread of growth. Also important are the ease with which foliage can be seen through and its seasonal variation.

Keep in mind that coniferous trees provide some greenery year-round.

Landscape design can be manipulated to create a natural looking scene, or one very manicured and tailored. The total effect is achieved through co-ordination of different elements.

Remember it is difficult to maintain heavily-used areas if the surface material or ground cover is not resistant to wear. Links to such areas should not be encumbered by vegetation — grass and hedges — which could be damaged.

Street furniture such as lighting standards, street signs, benches and waste receptacles should be well-designed and in scale with mobile homes. Light standards should cast enough illumination for safety but not be overpowering in stature.

## 10. Perimeter Treatment

The design of the perimeter or outer edges of a project is an important element in site planning.

The perimeter of a development is sometimes specially treated, or buffered, from those areas that lie beyond.

The function of a buffer is to soften the transition between areas of different land use, scale or intensity of development.

Buffers tend to separate a project from adjacent areas and create a feeling of enclosure and identity. Without a buffer a project integrates more readily with surrounding areas.

If the project is compatible in use and has been built to standards which are similar to those of surrounding development, buffers should not be necessary. A project which is incompatible or dissimilar needs to be separated from neighbouring land.

Natural buffers are usually more effective. For example, open space (parkland, playground), vegetation (grove of trees, orchard) or natural changes in topography (slope, ravine) are generally preferable to man-made barriers, such as fences or walls.

\*Urban Design Consultants. *Mobile Home Park Study, a survey analysis of mobile home residents and local officials in Ontario* (unpublished March 1975) p. 215.

## 11. Quality of the Environment

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There are certain forms, characteristics and relationships in a housing development which enhance one's appreciation of surroundings

Of general concern are factors affecting

- safety
- light
- quietude
- privacy
- comfort
- aesthetic appeal
- personal identity

Throughout the *Guidelines* an attempt is made to incorporate such factors into the discussion of site planning. For example, the provision of a reasonable degree of privacy for each household and the alleviation of noise are fundamental in siting groups of homes

There are two issues which merit some discussion at the project level although they are touched on later. The first, climate, is concerned with safety and comfort, the second, visual interest, with the aesthetic appeal and personal identity of the project

### Climate/Micro-climate

Almost the entire Province of Ontario lies north of latitude 42°. This means in effect an overall climate of short summers and long severe winters.

However, there are some extremes in the severity of climatic variations in the province — heavier snowfalls and lower temperatures in the north, the possibility of hurricanes and tornadoes in parts of the south

Generally, site designs for Ontario should try to:

- capture sunlight.
- provide shelter from cold winds
- provide for gain in temperature.
- reduce the disruptive effects of snowfalls

It is generally advisable for a site to slope to the south/south-east to capture sunlight and to use the landform as a natural barrier to prevailing winter winds. Where sites do not offer such natural features, an attempt should be made to compensate through judicious planting and appropriate orientation of individual homes

For parts of the province which are subject to extremes additional climatic protection is necessary. In areas subject to high winds, sites for mobile home projects should offer as much natural protection as possible

Where heavy snowfalls are common, the design of roads and parking areas should take into account the manner of snow removal common to that area

In areas subject to cold, harsh winds, projects built to higher densities may help to combat their effects. Shorter distances to walk and compactness of homes, trees, fences, etc., tend to break the force of the wind

In addition, variations occur at a smaller scale. Land formations, structures and vegetation can interact to influence the amount and angle of sunlight, wind patterns, pockets of frost, snow drifting and accumulation. Each site should be studied in detail to find the most beneficial solutions

Skilled site planning and design can take advantage of favourable conditions and deliberately change or avoid unfavourable ones

### Visual Interest/Personal Appeal

In site planning, the degree to which use is made of the natural landscape, its views, vegetation and land formations can be critical to the achievement of a pleasant residential environment.

Features such as streams, marshes, depressions and slopes should be exploited. Flat, barren sites are generally visually uninteresting so great effort is needed to supplement their natural character.

Variety in siting arrangements, types of mobile homes and landscaping within the same project generally creates a more interesting place. Variations such as these help avoid a monotonous appearance.

A site with large trees and changes in topography provides interesting contrasts to the similarities in mobile homes. They can then be seen against a backdrop of a forested area or a rise in ground.

The general appearance of the project is a composite of its segments. To convey a quality which is either urban or rural in feeling (not in location) different approaches to design are necessary.

A rural landscape has vegetation and open areas as the dominant features, an urban landscape has structures and the spaces they form, dominant.

A project must have a low density to be of a rural character. When mobile homes, which are small buildings, are placed on large lots the cohesion of the street-scape will be interrupted. In this case abundant landscaping or a site heavily treed will help neutralize open areas between homes.

When mobile homes are placed on small lots it follows that higher densities are created. Accessory structures and landscaping in the form of screens or walls

## 12. Size of the Project

can be used to create the cohesive elements of an urban landscape.

Because mobile homes have relatively low-sloping or flat roofs there are no large dark neutral roof masses to visually tie the project. (Exceptions might be those models with a 'mansard' roof.) There is little contrast when light-coloured mobile homes are seen against pale northern skies

For these reasons the use of consistent or co-ordinated colours in a small project or segments of a large project helps the visual appearance

An example would be the use of a range of colours referred to as 'earth-tones' popular in some housing projects.

Designing for diversity also means designing for a variety of people and interests. The degree to which residents can personally adapt their homes and yards to fit their personal requirements and tastes may well be a strong contributing factor in the successful design of any residential neighbourhood

It is recommended that mobile home projects be designed at a scale that is appropriate to the community, with due consideration for the potential physical and social impact on both the community and mobile home residents

This would apply to any project regardless of the type of land ownership. In effect, this means that even where the housing market can absorb a large number of mobile homes, consideration should be given to providing several smaller projects rather than one massive project which is more difficult to integrate into the community

It would also be inappropriate to design an extremely large mobile home project for a relatively small community, since the result would be an overwhelming mass of one type of housing

The scale of a project also has significant social implications. The residents of any large project are more physically isolated from other residents of the community, which may tend to encourage undesirable segregation

While scale is the major consideration affecting the maximum limitation in size other factors influence the lower limit

### Subdivisions

For mobile home subdivisions, small pockets of mobile homes are quite acceptable when properly located and planned. In such situations, the site planning and urban design considerations generally appropriate should apply

### Parks

Mobile home parks are somewhat different, due to the fact that the 'lots' are rented and the project is managed. Here a major concern is that the park be large enough to permit efficient management. This usually means full-time management by one or more people. However, in some parts of Ontario parks tend to be smaller with management on a part-time basis

The site planner should recognize the constraint of management on project size since it so clearly affects the viability of a mobile home park and, in turn, the interests of the municipality

The size of a project may well be reflective of its orientation. For instance, larger populations will undoubtedly be required to support projects with extensive recreational facilities

### **13. Density of the Project**

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Within the context of these guidelines it is assumed that the mobile home is used as a free-standing, single-family dwelling. Therefore, in general, densities for mobile home projects can be expected to fall within the same range as for other single-family detached housing. The only way higher densities can be achieved is by sacrificing some of the amenities of the residential environment.

Some variations in density occur as a result of such factors as the particular type, model and size of mobile home, the street pattern, local standards and the siting of the home in relation to its immediate neighbours.

The *gross* densities, or the number of homes situated within the boundaries of a project are affected by the size of recreational facilities, storage areas, areas for future expansion, the type of sewage servicing (lagoons, septic tanks, municipal system) and the widths of streets among others.

Since these characteristics will vary between projects, it can be expected that *gross* densities will vary.

The *net* density, or the number of homes on project land exclusively devoted to individual plots or lots should be determined on the basis of performance in terms of relative spacing of dwellings, setbacks and yard characteristics.

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## PLANNING THE INDIVIDUAL MOBILE HOME LOT

This part of the guidelines outlines the objectives of site planning and design for *each lot* in the project. These objectives are similar to those used in designing other types of housing projects.

Because a mobile home is a single-family detached dwelling unit the general approach to the design of its site should be the same as that for other dwellings. However, the characteristics of mobile homes noted in Part I call for special interpretation at detailed levels of design.

It is common practice in planning housing developments to establish a system for the division of residential land in which each lot is similar and based on

- a minimum area.
- the street frontage (the shorter the length, the less the cost of service lines within the street right-of-way, road surfacing, sidewalks, curbs, etc.);
- the setback, or distance between a lot or property line and the face of a building.

These are related to local planning standards and economies of development.

Common practice is not necessarily the best practice. When the housing units, lot sizes, shapes and setbacks are all similar the impact can be unfortunate.

Homes which are erected under normal construction techniques can be adapted to each lot by changing the location and type of doors and windows or the shape of the structure. Designers can also manipulate the appearance with a variety of facing materials, roof lines, etc.

It is common for buyers or renters of most conventional homes to make their choice after construction so opportunities exist to judge how well a particular home adapts to a specific lot and to its neighbours.

If a mobile home is purchased without considering how the model relates to a particular lot and the neighbouring homes there may be little choice but to establish uniform lot sizes, setbacks and siting patterns. However, when a project is developed within the same time period that homes are selected there is the opportunity to co-ordinate the lot siting with a particular model of home. Similarly co-ordination can be considered when purchasing a mobile home for a specific lot.

One contention of these guidelines is that more satisfactory developments can be achieved from the co-ordination of the mobile home's distinctive traits and the peculiarities of a specific location.

*Projects should be planned comprehensively.*

The relocation of mobile homes may pose a situation where such co-ordination is difficult but studies show that in Ontario mobile homes are not frequently relocated. When a mobile home is moved, it may be possible to replace it with a suitable model.

## A. The Home

### 1. Support/Anchorage/Services Connections

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After mobile homes are transported to the project site among other things they have to be placed on foundations, anchored, and connected to utilities before they are ready for occupancy.

Reference must be made to *The Building Code of Ontario* for the appropriate provincial requirements.\*

A mobile home should be as safely and securely positioned as any similar building designated for human habitation.



Any long side of a mobile home should be oriented away from prevailing winds.

\*Building Code Board of The Royal Society of Engineers of Canada, *Ontario Building Construction and Safety Code, The Building Act Regulation 925/75* (Toronto: The Queen's Printer for Ontario), Part 9.

Aim: provide for the safety and comfort of residents

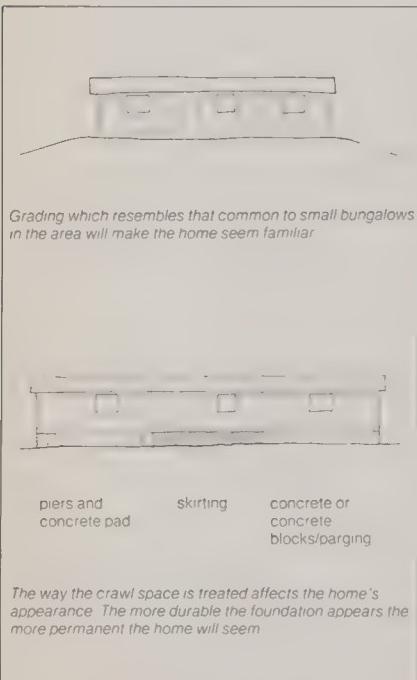
make the structure stable.

ensure the durability of the mobile home.

Situation	Guideline
the foundation/support system has to be constructed prior to the siting of the mobile home	co-ordinate the construction of the foundation with the actual mobile home. This is to accommodate site mobile home parallel to contours to reduce the cost of foundations
if the mobile home is oriented across steeply sloping ground contours, extensive foundations may be necessary	provide a structurally sound permanent foundation in accordance with <i>The Building Code of Ontario</i> of a type which prevents heaving under freezing and thawing action of the soil
improper foundation and anchorage can damage the mobile home and result in unsafe conditions  the mobile home should be supported at loadbearing points at locations designated by the manufacturer.  there are optional systems which may be used.	anchor the mobile home to the foundation or ground to avoid lateral movement, as specified in <i>The Building Code of Ontario</i>  orient long side of mobile home away from strong prevailing winds  avoid excessively windy lots — hilltops for instance  use wind-breaks where feasible

\*\*Position of A mobile home on a slope should be such that it will not roll down the slope. A mobile home should not be located on a hilltop.

The possible structural systems which might be used to support and/or provide a permanent base for a mobile home could vary under acceptable building practice

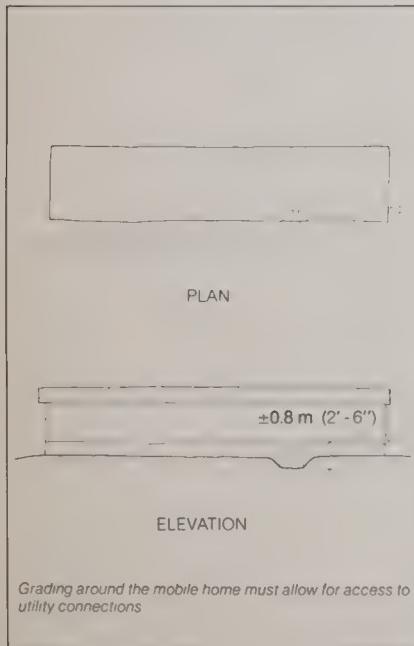


Aim: create appearance of stability and permanence in siting the home.

Situation	Guideline
a crawl space results when the mobile home is supported on piers or columns  open crawl space may give illusion of lightness and insecurity	place mobile home on continuous substructure with access where necessary, or, if the mobile home is supported on a system such as piers which leaves the underside of the home exposed enclose crawl space with blocking or skirting
in some areas of the province the amount of snow accumulation makes it desirable to have the level of the door sill well above grade	consider using grading pattern which gives appearance of unit close to grade but one with which snow accumulation or surface drainage is not a problem
the hitch, or hauling device, and wheels when left attached to the home create an appearance of transience rather than permanence	remove hitch, wheels and under-carriage once mobile home is sited in position.

Water, sanitary sewer and electrical lines within the mobile home connect with lines servicing the home at more or less standard locations.

This aspect substantially differentiates mobile homes from conventional housing



Aim plan for efficient connections to water, sewer and power lines between the mobile home and larger scale services.

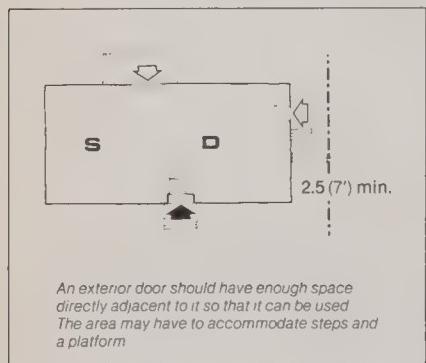
Situation	Guideline
the location of water, sewer and power connections are usually standardized.	locate water and sewer lines and power connections in conjunction with standard locations
most mobile homes built in Canada have connections in rear third of the home.	keep access to connections free of obstacles so repairs and maintenance will be easier
usually the point for water and sewer line connections is on side opposite the main entrance and on underside of unit.	locate water and sewer lines outside perimeter of home where possible so maintenance will not interfere with foundations, footings, or a reinforced slab
normally about 0.8 m (2 ft. 6 in.) is necessary between the finished floor line and the grade under the unit so there is access to water and sewer lines.	consider using a grading pattern which permits access at connections but reduces the height from the finished floor line to final ground level around remainder of home
newer mobile homes have fuel tanks under the unit (pump system), older mobile homes have tanks adjacent to unit (gravity feed system)	screen fuel tank if it is visible

## 2. Entrances

Exterior doors are more than just the points at which one enters or leaves a building. They are a significant factor in planning for the optimum use of yards because they are direct links between activities inside and outside the home.

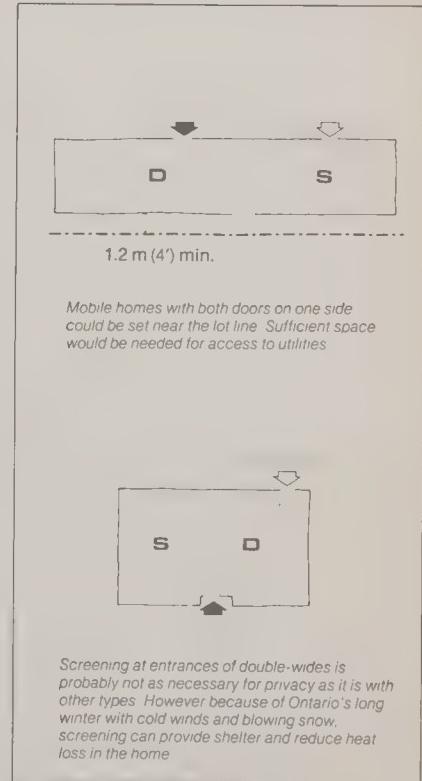
Traditionally there is one door, the main entrance, which is approached by the home's residents and by those not familiar with the home. It is generally located near a living room. Other doors — the secondary doors — are used primarily by members of the household.

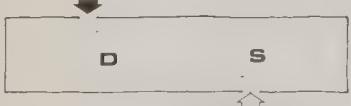
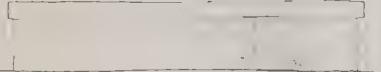
The main entrance becomes a point of transition between the non-private, outer world and the private domain of the home. It becomes, then, semi-private in character. It can be approached by anyone but it forms a barrier. It is also a significant factor in the orientation of the home.



Aim: conveniently distribute yard space relative to the location of door(s).	
Situation	Guideline
although there are exceptions the main door of most single-wide and double-wide mobile homes by convention occurs on a long side, the exact location depends on the model	correlate placement of the mobile home on a lot with the location of exterior doors for the specific type and model
some double-wides have a main door on a short side	
in expandable mobile homes the main door may be within expansion	
secondary door(s) can be on either of the long sides, or, in some double-wides, on a short side — it depends on the model	
for safety and easy access an exterior door should be equipped with steps, and a platform as required (See <i>The Building Code of Ontario</i> .)  the platforms or steps should be longer and wider than the door (See <i>The Building Code of Ontario</i> .)	provide a minimum of 2.5 m (7 ft.) from any lot line to any side of a mobile home having an exterior door not over 0.9 m (3 ft.) in width; this would allow for a platform 1.2 m (4 ft.) wide, steps of the same width and a walkway.
	provide a minimum setback from the side of a mobile home having an exterior door such as a sliding door over 0.9 m (3 ft.) in width, which would be sufficient to provide for steps, where required, a platform and walkway
continued	

continued	
Aim: conveniently distribute yard space relative to the location of door(s).	
Situation	Guideline
the exterior of a mobile home should be accessible for maintenance and repair  the connections to utilities must be accessible	provide a minimum setback of 1.2 m (4 ft) from any lot line to any side of a mobile home not containing an exterior door, which would permit access to utility connections and the side of home for maintenance and repairs without encroaching on another lot, or, if no setback is provided on a side not containing an exterior door access within the neighbouring lot must be provided  park — by stipulation in the lot rental agreement.  subdivision — guaranteed in the titles of the adjoining properties by an easement
setback requirements could differ with ownership patterns — local requirements may not have to apply where adjoining lots are under the same ownership, e.g. parks.	consider extending the setback standards recommended for mobile home subdivisions to all mobile home projects
the type of addition at entrances may vary depending on the mobile home model, the family needs and resources	assume that occupants may wish to have platforms or porches near doors but that the size and character of these additions may vary within any project



PLAN	
	
ELEVATION	

*If the secondary entrance is close to a neighbour's yard screening may be advisable*

*Screening at entrances can play a dual role by providing privacy as well as shelter from wind, blowing snow or rain*

Aim: provide reasonable privacy at entrances. have main entrance clearly identifiable. provide for a sheltered transitional area between the interior and exterior of mobile homes.	
Situation	Guideline
because the mobile home is manufactured without porches or steps they must be added after siting  there should be a sheltered area at the main entrance where residents or visitors can stand  not all mobile homes have a recessed area or a vestibule	provide a platform, porch or deck at the main entrance which is large enough to accommodate a person(s) standing  orient main entrance away from prevailing winds and/or provide protection by screening or a covered area
the entrances to mobile homes may look similar in appearance before the mobile home is sited, particularly when the entrances are on the same side	clearly define the main entrance of the mobile home
in single-wide and some expandable mobile homes the main entrance opens directly into daytime living areas  the main entrance into double-wides often opens into a vestibule	screen for privacy at a main entrance when entry is directly into a daytime area with no vestibule.
secondary entrances in single-wide or expandable homes usually open into the most private section of home — the hallway within bedroom/bath area  secondary entrances into double-wides open into less private daytime areas	screen for privacy at a secondary entrance when the entry is into hallway serving sleeping area of home

### 3. Windows

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In addition to being sources of daylight the windows in a mobile home will be points of visual and verbal contact between the interior and exterior — watching for visitors, supervising yard activities, enjoying a distant scene, etc.

Windows play a vital role as a site design element. Their arrangement and size will be important in the planning of yard areas and in orientation of the home. They are also one of the chief influences in the appearance of any structure.

The locations of windows affect the acoustical performance of the home also. This is discussed later in 'Separations for Privacy'.

Aim: permit adequate natural light to enter. use windows for visual contact where appropriate. capture pleasant views and vistas when possible.	
Situation	Guideline
single-wide and expandable mobile homes have more window/floor area than a conventional bungalow *	don't overshadow the mobile home with a larger structure  orient mobile home so large windows are appropriately located for summer and winter sun  correlate areas for outdoor activity with indoor layout when supervision and interaction is advisable  orient the mobile home and/or choose a model so windows which are frequently used capture variety in surroundings — kitchen and living room windows are most important in this respect  provide adequate separation from surrounding buildings to capture a view  arrange vegetation and screening to accentuate views to form vistas

\*Special Studies Section, *Mobile Homes in Ontario Construction and Costs*, p. 19

Aim: ensure reasonable privacy.

Situation	Guideline
there may be a lack of privacy near large windows, this is more apparent in some mobile homes because interior space is limited — there is no place to withdraw	use distance, screening or orientation to achieve privacy at windows where desirable
because of their shapes double-wide and some expandable mobile homes have more interior depth near large windows	
the location of the large window(s) will be a critical factor in the privacy of the interior space	

winter



summer



*An overhanging roof or awning can provide year-round shelter from rain and snow at a window or door. In the summer it can also protect the interior from excessive sunlight when the sun is high in the sky. During winter months when the sun's path is nearer the horizon it allows sunlight to penetrate into the home.*

*Partial screening from trees or trellises can be effective — they are attractive to look at and let ample daylight enter the interior; at the same time they reduce the extent to which the interior can be seen.*

Mobile homes usually have at least one large window which cannot be recessed since it is set within a thin wall. The interior area behind such a window could be exposed to public view unless precautions are taken.

It is unfortunate to have to resort to drawing curtains to maintain privacy during the day; the lot and site should be planned so that the interior of the home cannot be seen from public areas.



*The view into the home from the path could be reduced by increasing the vertical distance to the window sill.*

#### 4. Enclosed Additions to the Basic Mobile Home

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The volume of interior space in mobile homes is limited. There is no attic storage space and mobile homes in Ontario are seldom placed on a foundation wall designed to include a basement.

Due to limited space many occupants have made additions to their mobile homes after they have been sited or occupied.

Totally enclosed additions will not only increase the volume of space and floor area but will change the visual form as well. The materials used and the method of construction may change the general appearance of the home if they differ substantially from the original home.

It is recommended that the size and shape of a portion of lots in mobile home projects reflect the tendency of residents to increase available space through additions to their home.

Aim provide space on an individual lot for possible additions of totally enclosed living and storage space to basic mobile homes.	
Situation	Guideline
by 1973 over 40% of mobile homes in a sample survey of selected mobile home projects in Ontario had totally enclosed space added to them	make reasonable provision for the popularity of additions
the majority of the additions had been made to single-wide mobile homes	examine trends in the characteristics of additions to mobile homes in Ontario and in particular locations
roughly two-thirds of the additions were totally enclosed porches which contained space for coats, boots, etc. *	
roughly 20% of the additions included sleeping areas either separate or in joint use with daytime areas	
the remaining 15% were used exclusively as daytime areas. **	
more than half of the totally enclosed additions were over $13.9 \text{ m}^2$ (150 sq. ft.) in area and only 2.5% over $27.9 \text{ m}^2$ (300 sq. ft.) *	
although few additions to double-wide homes were noted in 1973, by 1977 there appears to be a trend to add to double-wide homes also	
an addition which does not compliment the original mobile home in appearance may make it appear visually confused	use materials, methods of construction for any addition which is in keeping with the original design; for example, some manufacturers market sections or additions which may match original model

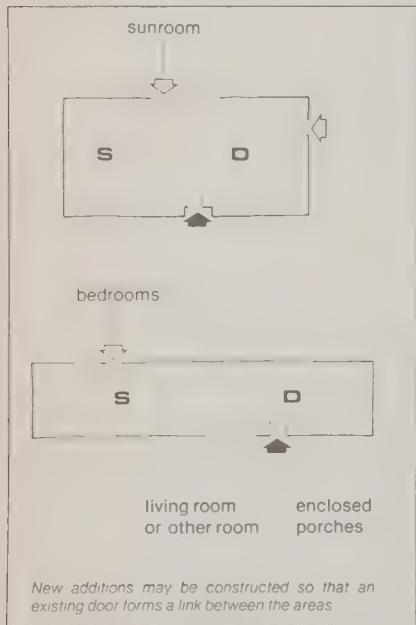
\*Urban Design Consultants, *Mobile Home Park Study*, p. 169

\*\*ibid., p. 171

## 5. Accessory Structures

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The location of an expansion may relate to the characteristics of the particular home. In structures such as mobile homes where space is at a premium it may not be desirable to sacrifice a portion of wall in a room for a link to an additional room. It is probably more convenient to let an exterior doorway form the link or to create a break within the long hallway.



A mobile home project resembles other single-family housing projects in the types of accessory or unattached structures which are found, notably storage sheds, garages and clothes lines. However, some structures are more prevalent.

Separate storage structures are part of the visual scene in most mobile home projects while the number of garages and carports remains small at this time.

Aim: adequately accommodate separate storage structures.	
Situation	Guideline
the mobile home has less storage space than the conventional bungalow	plan for extra storage space for each mobile home lot
most mobile homes have been found to have added long-term storage space	consider the use of a multi-purpose structure — storage within a garage or carport or a shed which acts as a screen between street and patio
it is possible to design an accessory building which is multi-purpose	
a separate storage structure will be seen by neighbours and others	provide for a storage structure that is attractive, well constructed and maintained

## B. Functions of the Lot

### 1. Purposes of the Lot

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A lot which contains one dwelling in a single family housing project serves several purposes. In a mobile home project it will contain the basic mobile home plus any additions to the basic unit or accessory buildings.

If off-street parking is planned within lots, space has to be provided either covered in a carport or garage or uncovered.

Circulation occurs within the lot. People move about sometimes on defined paths such as a walkway to the main entrance, or more freely throughout yards.

A lot may contain areas specifically assigned to normal household uses — for drying clothes, storing rubbish or growing vegetables.

The volume of space enclosed by the lot's boundaries acts as a separator from neighbours, public areas or undeveloped land protecting residents from unwanted intrusion. Disturbance from noise may be lessened since its volume is somewhat ameliorated over distance. Similarly visual intrusion is reduced with distance.

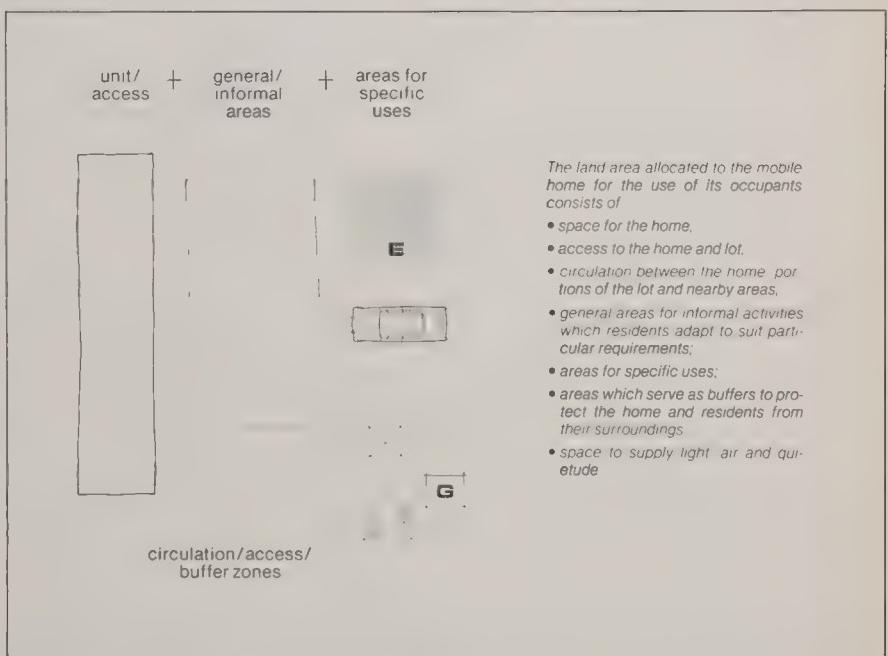
Spatial separation brings light, either as direct sunlight or indirect daylight and air.

For mobile homes one of the most significant purposes is to extend the area for human activities beyond the physical confines of the home.

Areas are not mutually exclusive. For example, space for circulation may also act as a buffer and play area. Skilful handling is required of the designer to relate these various spatial needs in a manner that is both efficient and attractive for residents.

Some areas like parking are fairly measurable while others such as a buffer zone depend on the placement of the mobile home within a group of homes.

The distribution of spaces should relate to the characteristics of the individual home and its surroundings



*The land area allocated to the mobile home for the use of its occupants consists of*

- space for the home,
- access to the home and lot,
- circulation between the home, portions of the lot and nearby areas,
- general areas for informal activities which residents adapt to suit particular requirements;
- areas for specific uses;
- areas which serve as buffers to protect the home and residents from their surroundings
- space to supply light, air and quietude

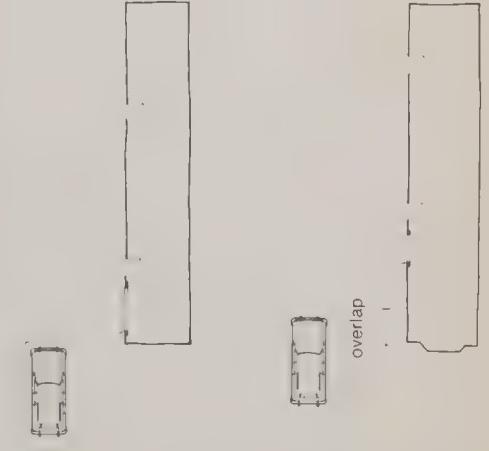
## 2. Access and Parking

This topic covers the access, or path, and manner of arrival of persons to the home, and of cars and the mobile home itself to the lot. Generally, the approach would attempt to be direct, convenient and safe although it is not always possible to equally satisfy all these requirements.

- Aim:
- provide access routes for vehicles and pedestrians which are convenient, safe and as free of congestion as possible.
  - provide access in case of emergency.
  - provide sufficient parking accommodation for residents and visitors.
  - provide parking accommodation which does not interfere with other uses of the lot.

Situation	Guideline
hauling of the mobile home will be easier if accessway for mobile home is kept clear of large obstructions  hitch and running gear can be reattached  some projects, such as those serving an industry, may have special transitory characteristics; the homes may need to be moved  some residents may want to relocate their homes	landscape accessway with vegetation, fencing and so on, which can be easily removed and replaced if it is intended to move the mobile home.
mobile homes can be severely damaged by fire because of the flame spread characteristics of interior finishes and highly combustible construction *	provide access around the entire home for fire-fighting equipment
the transition between parking and walking is generally safer when parking is not within the paved or travelled portion of the street	separate vehicular and pedestrian routes whenever possible.  in general provide off-street parking.
long driveways on residential lots can result in hazardous situations when vehicles have to 'back-up'	avoid a long driveway on a residential lot; consider alternative parking near the street or in a driveway with 2 access points

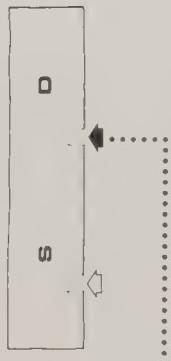
\*Insurers Advisory Organization, *Improving the Safety of Mobile Homes*, p. 35

continued		
Situation	Guideline	
a sample survey of selected mobile home projects in Ontario showed that three-quarters of mobile home residents in Ontario own one vehicle *	provide parking spaces for each lot in a mobile home project similar to those required for other new single-family detached housing in the area	 <p>The diagram illustrates a mobile home (represented by a tall, narrow rectangle) and a parking area (represented by a long, narrow rectangle). The parking area is shown overlapping the side of the mobile home, indicating that it is not directly in front of a major window or door.</p>
most households need visitors' parking	provide residents' parking on each lot or within close walking distance of home	
some areas of the province may have specific, unusual parking needs.	provide visitors' parking as required with residents' parking or within reasonable walking distance.	
if there is no spatial separation between the home and its parking space(s) there could be damage to the home or conflict between vehicles and pedestrians	clearly separate parking area and the mobile home to control safety and nuisance	
parking may not be clearly separate and within defined areas unless the space is identifiable and suitable	plan parking area of suitable material such as gravel, concrete or asphalt, clearly separating it from any other use by defining the edges	
if parking area is in front of a large window it will obstruct the view and/or be unattractive from inside the home.	avoid locating parking area directly in front of any large window	
a group parking area will be public in character	separate a group parking area from individual mobile homes by a minimum of 6 m (20 ft.) **	
a group parking area may be more of a nuisance to households than individual parking		

\*Urban Design Consultants, *Mobile Home Park Study*, p. 197

\*\*See also Central Mortgage and Housing Corporation, *Site Planning Handbook* (Ottawa: NHA 5049 9/73), p. 17

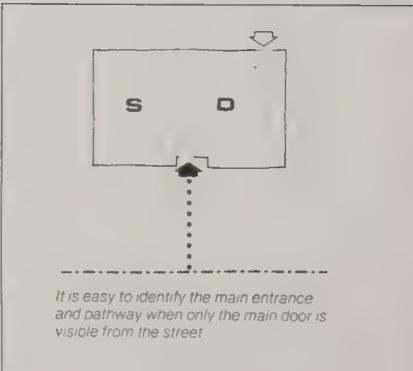
Parking may overlap the side of a mobile home when it will not be directly in front of a major window or door



The walkway to the main entrance should be clearly separated from an entrance into the sleeping area.

**Aim:** provide clearly defined pedestrian route(s) to the home.

Situation	Guideline
when some mobile homes are placed diagonally or perpendicularly to the street main entrances may not be easy to identify	clearly define a pedestrian pathway by using suitable surface material (paving, gravel and entrance features such as a gate)
there is a tendency for people to take as direct a path as possible	provide a direct pathway of durable material to a frequented area.
if the mobile home is sited so that the secondary entrance is closer to the street than the main entrance, it may be difficult for visitors to identify the main entrance	clearly separate the pathway to the main entrance from the secondary entrance.



It is easy to identify the main entrance and pathway when only the main door is visible from the street

### 3. Types of Outdoor Activities

The activities which different households engage in, both indoors and out-of-doors, undoubtedly differ widely. But there are a series of events which can be expected within any normal household routine, plus others which might occur fairly frequently in any single-family housing project, such as those engaged in by a family which enjoys the out-of-doors.

Because of space limitations in mobile homes — particularly single-wide homes — there may be great demand for outdoor space for hobbies and activities which could be carried on indoors in more conventional homes. Exterior maintenance and cleaning of mobile homes is also an important activity in order to keep the siding and roof in good repair.\*

The following outline notes the range of activities which might be expected to take place on individual mobile home lots in a variety of projects. Since projects differ in terms of such factors as family size, age of residents and recreational facilities available nearby, not every activity can be expected within all projects.

All the activities listed might not necessarily occur in one household. Some would always occur, such as access while others (hobbies and sports) might not.

Type of Household Activity	Examples of Activity
Circulation and Access	<ul style="list-style-type: none"> <li>• approaching the home</li> <li>• departing the home</li> <li>• circulating within the lot</li> </ul>
Housekeeping Functions/Maintenance	<ul style="list-style-type: none"> <li>• collecting and disposing of rubbish</li> <li>• drying clothes</li> <li>• mowing grass</li> <li>• shovelling snow</li> <li>• barbecuing/dining</li> <li>• exercising pets</li> <li>• repairs to home</li> <li>• cleaning aluminum siding</li> <li>• waterproofing roof</li> </ul>
Communicating	<ul style="list-style-type: none"> <li>• supervising children</li> <li>• greeting visitors</li> <li>• general conversation</li> <li>• entertaining friends</li> </ul>
Leisure Time Activities	
Arts, Crafts, Hobbies	<ul style="list-style-type: none"> <li>• sketching</li> <li>• carpentry</li> <li>• gardening</li> </ul>
Exercising	<ul style="list-style-type: none"> <li>• practising yoga</li> <li>• doing keep-fit exercises</li> </ul>
Relaxing	<ul style="list-style-type: none"> <li>• sun bathing</li> <li>• sitting</li> </ul>
Education	<ul style="list-style-type: none"> <li>• reading</li> <li>• doing home work</li> </ul>
Informal Social Activities	<ul style="list-style-type: none"> <li>• entertaining friends</li> <li>• playing bridge or other games</li> </ul>
Community Activities	<ul style="list-style-type: none"> <li>• hosting service, agency or neighbourhood meetings</li> </ul>
Recreation	<ul style="list-style-type: none"> <li>• playing badminton</li> <li>• playing croquet</li> <li>• playing hide-and-seek</li> <li>• wading in pool</li> <li>• climbing/swinging on play equipment</li> </ul>

\*Special Studies Section, Mobile Homes in Ontario,  
Construction and Costs, p. 20

#### 4. Lot Privacy

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Outdoor activities can be influenced by a variety of things — the physical characteristics of the home, the size and shape of the lot, the proximity of neighbours and the street, to mention a few.

Activities will differ in

- their locational requirements;
- the area necessary in order to undertake them;
- the desirability of undertaking them in some relative degree of privacy.

The attitudes of different households towards these three issues undoubtedly varies greatly just as activities vary. However, some activities will be confined to specific locations, others will not. Children generally play informally anywhere on a lot. In contrast, gardening will take place where the sunlight and soil conditions are suitable and plants won't be trampled on.

Passive activities such as sunbathing need little in the way of spatial requirements but many people will prefer to do it in private. Playing 'catch' needs much more space but there is probably no need for privacy.

The home and its lot should be able to provide different degrees of privacy for its residents. The differences in degrees range from the withdrawn, secure space inside the home to the very open and communal borders to public areas.

Each household may perceive privacy differently — some may value seclusion highly while others may find barriers undesirable. Although these individual preferences are recognized, where and when desired privacy should be obtainable. This issue has been fundamental in earlier discussions of entrances and windows and continues throughout this part in other topics, 'Separations for Privacy' in particular.

Because the mobile home is a manufactured product it cannot respond to its surroundings through massive changes in construction materials, basic form or other details of design. Some choices can be made, such as in the choice of mobile home type and in the location of exterior doors and windows. The design of the lot — its shape, size, landscaping — and the design of bordering areas become critical and must meet the requirements of the mobile home and its inhabitants.

A survey of selected mobile home parks in Ontario pointed out the following:

1. Privacy/Quiet ranked in second place in the number of times a reason was mentioned for being satisfied with the mobile home lot.\*
2. Not enough privacy was one reason given by those who were dissatisfied with their lot.\*\*

Aim: provide sufficient space for individual household activity preferences and requirements when designing the mobile home lot.	
Situation	Guideline
mobile home residents can be expected to engage in normal household activities	provide for normal household activities on lot.
household preferences for outdoor activities, and their locational, spatial and privacy requirements will vary between households in a mobile home project	plan lots within a mobile home project so they can be adapted to particular needs of individual households  explore opportunities for multiple use of space for different activities either simultaneously or at different times
mobile home residents may have to carry on some activities out-of-doors which might normally be done indoors, such as repairing equipment or carpentry	provide ample space preferably near any auxiliary storage area for the repair, maintenance or hobby-type activities of household members
because of indoor space limitations and noise transmission, young children may need to spend much play-time out of doors	provide small children with an area suitable for play where they can be supervised from both indoors and out-of-doors

\*Computer printout from Urban Design Consultants, Question 35 (b)

\*\*Urban Design Consultants, *Mobile Home Park Study*, p. 219, Table 118

Another study of single-family housing on small lots in Ontario also highlighted the need for yard privacy. Although 79.3% of the residents interviewed had at least a portion of their lot partially screened, 56.8% felt their yard privacy needs had not been met.\*

The majority of residents also felt that ". . . having one's own private yard space was 'very important'" and ". . . that more public green space closer to their homes would not affect the importance of their private yards."\*\*

### **The Degrees of Privacy**

Within the context of these guidelines the degrees of privacy are described as

**private** — an outdoor area(s) of an individual lot which is intended to provide household residents with some relative degree of seclusion similar to that of indoor areas

**semi-private** — an outdoor area(s) of an individual lot where some degree of seclusion is granted to the household residents by distance, screening or configuration. This includes the main entrance area where some degree of privacy should be combined with clear identification and use by non-household members

**non-private** — an outdoor area(s) of an individual lot which does not offer seclusion to household members because of the proximity and/or exposure to publicly used areas or neighbouring households

### **A Private Yard**

Many people find it desirable to have an outside area which is private for the immediate household. Single-family detached housing can be designed so that at least a portion of the yard offers a degree of privacy similar to a living room. Because the interior living areas of mobile homes are limited, a private area out-of-doors may be very much appreciated.

Such a private area can be used for many activities — entertaining, reading, sunbathing, eating, and so on. The traditional 'patio' may form all or part of the area.

To be private the area should not be seen from other lots, other homes or other areas beyond the lot such as a street or sidewalk. Objectionable sounds and odours should also be absent, for example, traffic noise and barbecue fumes and smoke from a neighbouring yard.

Since the private yard area is to be considered as an extension of the daytime living area it would seem reasonable to suggest the minimum size and dimensions approximate the minimum interior daytime living area permissible in new housing in Ontario.

The suggestion of a private yard area is not meant to preclude the desirability of shielding other areas of the lot from general view. It may well be that many households would prefer a major portion of their lot private.

In some instances it may not be desirable to shield yards with any form of screening. Distance or proximity to open space such as parkland may give adequate protection.

Moreover, openness may be desirable in situations where social contact is of prime importance.

For example, in retirement communities residents may share similar expectations and be mutually dependent for personal safety and well-being as well as companionship.

However, individual interviews in a project where openness is a dominant feature privacy was still considered important and influenced the use of yards in some instances.\*\*\*

\*Research & Development Section, Ontario Housing Corporation. User Study Zero Lot Line Concept (Toronto: Ontario Ministry of Housing July 1975), pp. 90-92

\*\*ibid., pp. 80, 81

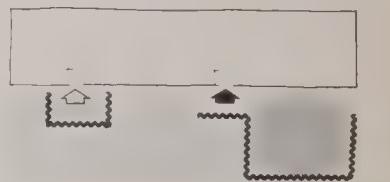
\*\*\*Because of their personal nature the individual questionnaires on which Urban Design Consultants based their findings remain confidential material.

<p>Aim. provide residents with the option of having a part of the lot which can be a private outdoor zone.</p>	
Situation	Guideline
a private area which is convenient and pleasant could be used for as much of the year as possible	orient a private yard to receive sunlight for as long a period of the year as possible
<i>The Building Code of Ontario specifies these minimum room areas when the space(s) are combined:</i>  living room — $11.1 \text{ m}^2$ (120 sq. ft.) dining room — $7.9 \text{ m}^2$ (85 sq. ft.) kitchen — $4.2 \text{ m}^2$ (45 sq. ft)  the minimum dimension is 3.0 m (9 ft. 10 in.) under <i>The Code</i>	provide a private yard area which is a minimum of $23 \text{ m}^2$ (250 sq. ft.) with a minimum dimension of 3 m (10 ft.)
a hard surface accommodates furniture more easily than a soft surface	the more heavily used portion of a private yard should be hard-surfaced
a physical barrier may be required for visual privacy  the number of sides of private yards needing barriers may differ (expandables may screen on two sides; some lots may border on a wooded area)	surround the private area by screening where needed for visual privacy which cannot be seen through and which is not under 1.7 m (5 ft. 6 in.) or average eye-height  alternatively, secure visual privacy through distance or type of bordering area
screening may not alleviate sounds and odours	locate the private yard area away from possible sources of noise and odours
the private yard area could be used for a variety of activities  when not needed for private activities, the area could be used for activities of a semi-private or non-private nature	provide space for a private yard area in addition to yard areas required for other household uses such as parking and storage

### Implications of Orientation for Privacy

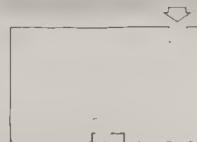
The sketches which follow show how distance, orientation and screening can be used to create private, semi-private or non-private areas. The boundaries between different privacy areas may be clear. This is characteristic of fences, walls or vegetation used for visual privacy. The boundaries may be vague where distance creates semi-private or aurally private areas.

Examples also examine how the degrees of privacy change with a different observer point

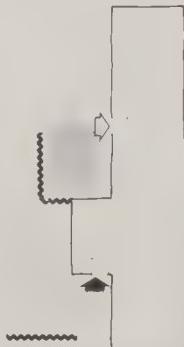


These private yard areas need screening on 3 sides. The private yard closest to the street could be visually private but aural privacy might be lacking.

\*See room areas, Building Code Branch, *The Building Code*, Part 9



public open space



**Screening** — fences, walls or vegetation — can be used to create and separate different privacy areas

The mobile home is the barrier which shields a private yard area

Consider the effect of adjacent areas such as public open space. When parkland is in use, the area of the lot which borders it might not be private

Expandable portion of the mobile home helps shield a private yard

## C. Distribution of Outdoor Space

### 1. Indoor/Outdoor Links

Some activities or uses of yard space are dependent on contact with the interior of the home. For example a mother will want to keep close watch over her small child at play in the yard while she goes about her normal indoor household activities. Since she probably spends a good deal of time in meal-related activities she may arrange for the child to spend much of his play time outdoors where she can see and reach the child quickly from the kitchen. Links act both ways. A small child may feel more secure if the parent can be seen.

The physical characteristics of the mobile home, shape, interior layout and the location of doors and windows are important factors in anticipating indoor/outdoor links.

Contact or linkages take place through the openings in the home's shell — the doors and windows. Visual linkages can take place through windows, open doors or doors with windows. Speech communication needs an open door or window. Doors are designed for direct contact by movement.

If in designing the lot or for a home the possibilities of such linkages are kept in mind the living may be much more efficient and satisfactory.

**Aim** design the lot and site the home on the lot to create efficient and satisfactory links between the interior and exterior of the home.

Situation	Guideline
linkages between indoor/outdoor activities and uses may vary between types and models of mobile homes because of the different shape and location of exterior doors and windows.	arrange outdoor space for specific activities or uses in relation to the specific model of mobile home and its siting on the lot.
a private yard can serve as an extension of indoor living space	locate private yard area near daytime living area where possible
the washer and dryer are usually located near secondary entrances in sleeping area of home, near bathroom plumbing (single-wides, expandables); near kitchen area in double-wides	locate outdoor clothes drying area near secondary entrance of mobile home.
the location of the kitchen and main entrance which are within the daytime area vary with the model of mobile home	locate the outdoor cooking and eating area near the kitchen and an entrance locate a small child's play area so it can be observed and be accessible from kitchen/daytime areas
household rubbish is temporarily stored before being collected or disposed of.	locate rubbish storage so it's convenient to both the kitchen and the place of collection, which is usually the street
long-term storage and general repair area may relate to both indoor and outdoor functions	locate long-term storage and repair areas so they are accessible; however location can be determined with some flexibility and determined by such factors as orientation and appearance.
visitors use the main entrance.	clearly link visitor and resident parking and access to the main entrance of the home
assurance of security is gained if residents parking and access is linked to daytime areas of the home rather than to sleeping areas	locate the parking area so surveillance is possible from daytime area
large windows could provide links between areas inside and outside the home which serve the same function — the private yard area and living room	where appropriate locate the private yard area near the large window

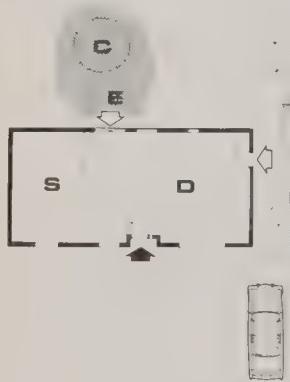


Some activities or yard areas form links with characteristics of mobile homes because of the location of sleeping and daytime areas of the home and position of the exterior doors and windows.

The location for storage and maintenance can be treated with some flexibility. These alternatives might be equally satisfactory.

Direct access to the private yard might be incorporated in an addition to the mobile home adjacent to the main entrance.

## 2. General Arrangement of Outdoor Space



*Linkages with a number of activity areas around a double-wide home may be most conveniently located near the daytime area because it contains both main and secondary doors and laundry facilities.*

The shape of the mobile home can influence the relative size of adjacent yard areas

Yard areas of mobile home lots will have to accommodate a wide range of activities and uses. It is advisable to provide yard areas which are of appropriate shape as well as area. A linear pattern of activities may inhibit the functional use of space. For example, if they are spread only along one length of a single-wide mobile

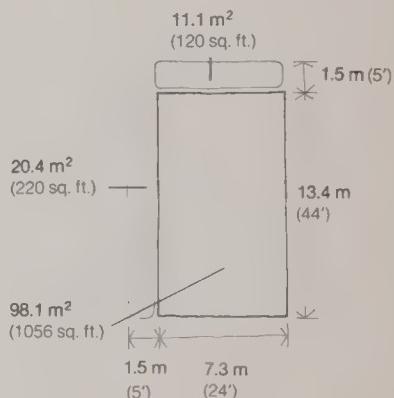
home multi-use of the space for related activities may be difficult.

Although there is no definitive answer to the question — "what size yard is needed to contain residents' outside activities?" there are indicators designers and municipal officials can consider

1. The Central Mortgage and Housing Corporation requires a private outdoor space (yard) with a mini-



*If the space or yard area adjacent to the long side of the mobile home is narrow it may be awkward to use even though the square footage is sizable*



*Because the basic form of the double-wide mobile home is different from that of the single-wide the adjacent yard areas will be different*

- mum dimension of 7.5 m (25 ft.) for both conventional housing and mobile home lots.\*
- 2 In comprehensively planned developments CMHC requires an outdoor living area for housing units at grade equal to at least one half the gross finished floor area. This must be one uninterrupted space.\*\*
  - 3 In a recent study of housing projects in Ontario 89.3% of residents questioned felt the rear yard, or main yard, minimum acceptable depth was 4.9 - 6.1 m (16 - 20 ft.).\*\*\*
  - 4 A yard which contains a private yard area and patio should be more than 3 m (10 ft) wide. If the depth is not greater than 3 m (10 ft), the patio could be used as a circulation route to other parts of the lot. Five m (16 ft.) would allow room for a private yard plus comfortable access.

It appears a yard width ranging from 5 to 7.5 m (16 - 25 ft.) would be acceptable to residents for the yard area in which most activities will take place.

Some coordination between the lot width and lot area is suggested. For example, if the yard area is adjacent to the long side of a single-wide mobile home, 5 m (16 ft.) would probably be sufficient width since the total area would be sizable. A yard width of 7.5 m (25 ft.) would be more suitable where the other yard dimension is limited.

Different widths are necessary for different activities. A 1.2 m (4 ft.) setback for maintenance and access

may be used in some manner by some households but its adaptation would be marginal. On the other hand, a side yard of 2.5 m (7 ft) could be used for a limited range of activities such as storage or gardening.

The front yard or distance from habitable portions of the mobile home to the lot line at the street can vary and is influenced by a number of factors. Among these are

- land ownership (is there a street right-of-way?)
- the design of the street area (is there a sidewalk, how wide is the boulevard; where are services located, where do cars park?)
- local standards for similar housing (will the setback be compatible with other housing nearby?)

Reference can be made to other sources for suggestions for setbacks from the *street lot line*

1. Central Mortgage and Housing Corporation establishes a setback requirement of 3.7 m (12 ft.) from a lot line abutting a street allowance to a mobile home.\*

2. A report prepared by consultants for the Ontario Ministry of Housing for the express purpose of reducing housing costs through proposed urban development standards suggests a 3 to 6.1 m (10 - 20 ft.) minimum distance from the front yard lot line to the house varying with the type of room fronting on the street and the presence or absence of a sidewalk.\*\*

\*Central Mortgage and Housing Corporation, *Site Planning for Mobile Homes*, p 9

\*\*Programs Section *Urban Development Standards*, p. 33

Aim: provide outside areas of a size and shape which accommodate the household's needs and activities.	
Situation	Guideline
in a mobile home project the models of mobile homes may vary	distribute yard areas for each mobile home as required
yard areas should relate to the configuration of the particular home	provide a width of yard sufficient to accommodate activities which can be expected to take place within it and to permit comfortable access
some activities are either severely limited or impossible in a narrow yard	provide an area <i>at least</i> 5 m (16 ft.) in width (average) if it is to contain a <i>private</i> yard area or other areas of major activity
some separation is advisable between mobile homes for acoustical and visual privacy, ventilation, daylight and sunlight	provide adequate separation space between neighbouring mobile homes
adequate separation is a function of distance not area	

\*Central Mortgage and Housing Corporation, *Site Planning Handbook*, p. 19, and *Site Planning for Mobile Homes* (Ottawa NHA 5053 11/74), p 9

\*\*Central Mortgage and Housing Corporation, *Site Planning Criteria for Housing on Small Lots in Comprehensively Planned Developments* (Ottawa NHA 5049-A1), p 8

\*\*\*Ontario Housing Corporation, *User Study Zero Lot Line Concept*, p. 82 The study also states "Note that a new minimum standard of 20-25 ft. has been established for back yards" or 6.1 - 7.5 metres

### 3. Orientation

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Theoretically there is no 'front', 'back', 'right', or 'left' side to a mobile home. It can be adapted to a site by positioning and by the selection of a mobile home type and model on the basis of the location of exterior doors and windows or the interior arrangement of space.

The orientation to the street is important because it affects:

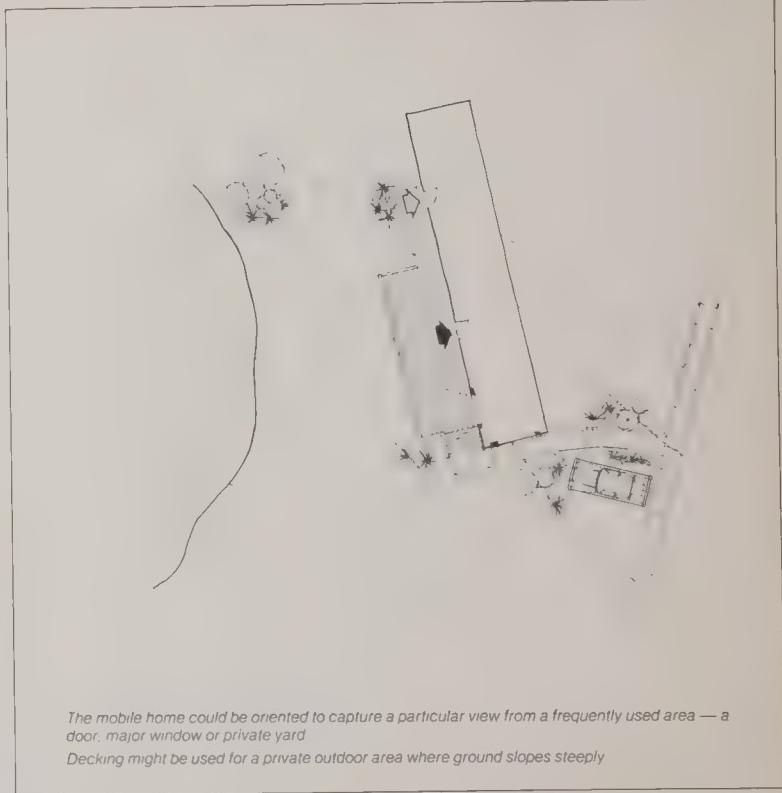
- the initial access route for the mobile home,
- the routes for vehicles and pedestrians,
- the positions of doors and windows,
- the links with yard areas,
- the lot size, shape and street frontage.

Most of this topic relates to the orientation of the mobile home to the street but the topic of the first chart, the site's natural features, should be carefully considered.

#### Orientation and Natural Features

Distinctive features of the site should be considered in orienting the home

Aim: take full advantage of natural features of the site, such as a slope, view, natural vegetation or nearby open space.	
Situation	Guideline
the mobile home is hauled to the site and manoeuvred into place	orient the mobile home to take advantage of a particular site <ul style="list-style-type: none"><li>• to capture a view,</li><li>• to utilize natural vegetation as screening at vulnerable areas</li><li>• to link major yard areas with undeveloped land such as an easement so character of open area is enlarged</li></ul>
the locations of large windows and secondary doors vary in different models	



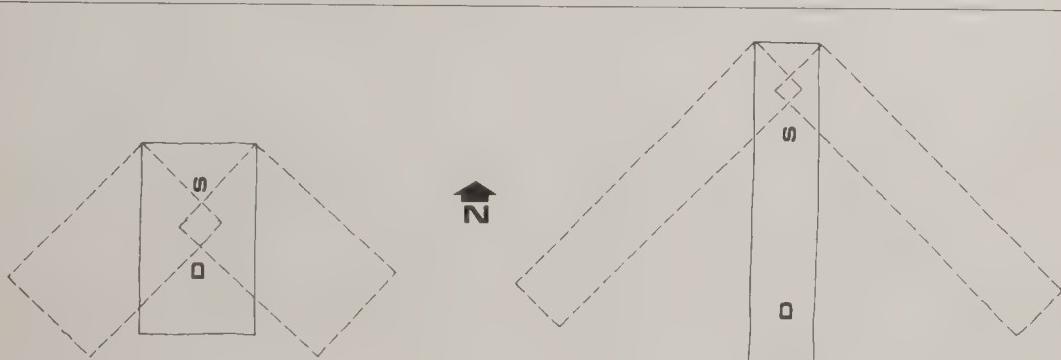
Site planning in Ontario should take into consideration the discomfort, disruptive effects and economic costs of winter temperatures, ice and snow and capture what sunlight is available in the winter.

The part of the home which can most benefit from the sun will be the daytime areas — the living room, dining room and kitchen. The objective should be to allow residents to enjoy the maximum number of hours of sunlight during the months which are cool and often overcast.

**Aim:** provide adequate sunlight to daytime living area.

provide adequate sunlight to private yard space to extend its seasonal use as long as possible.

Situation	Guideline
residents can enjoy sunlight most in daytime areas	orient living area in southerly direction when possible
sunlight helps to reduce heating costs in winter	
one-storey mobile home could partly shield patio	extend use of outdoor private area locating it so it receives maximum year-long hours of sunshine.



An orientation which allows daytime areas to face in a southerly direction is preferable in Ontario. The location of windows will influence the amount of sunlight that reaches the interior.

## Orientation to the Street

Topics which discussed the significance of exterior doors and windows mentioned orientation as one of the options available to obtain privacy at these vulnerable spots. The appropriate orientation for a particular model or type is unlikely to be most appropriate for all models and types.

Orientation forms the basis for planning groups of mobile homes and larger segments of the total project. Any pattern of orientation within a housing project should be a composite of the physical characteristics of the buildings and the lots, the way that outdoor space is expected to be used and links between the homes, lots and street.

It is useful to observe some of the relationships between the street — which is a public area — and different models and types of mobile homes in various positions on a hypothetically isolated lot. Some models adapt readily to different orientations, others do not.

### Parallel Orientation

When single-wide or expandable mobile homes are oriented so the long axis parallels the direction of the street the long but narrow shape of the home creates small side yards, and lengthy front and rear yards. The rear yard is protected from view from the street.

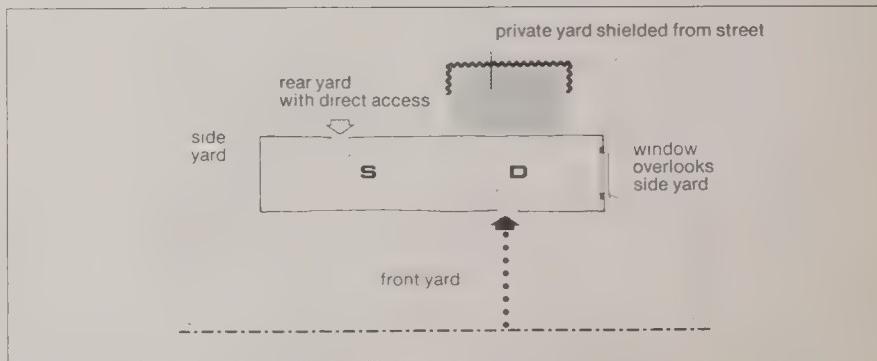
By comparison double-wide homes sited this way would be adjacent to longer side yards and narrower front and rear yards.

In general, if secondary entrances are on the side of the home away from the street it is probably desirable to keep the front yard setback to a minimum and accommodate private activities within the rear yard.

**Aim:** establish an orientation for any mobile home to the street on the basis of:

- the formation and potential use of the individual lot;
- its position in a group of homes;
- the total pattern of the project.

Situation	Guideline
'may not be possible to satisfy all situations for all models. A home plan or PUD's site linkages vs. privacy for example.'	plan for an optimum orientation recognizing that there may be some conflicting details in the siting of a mobile home in any orientation.

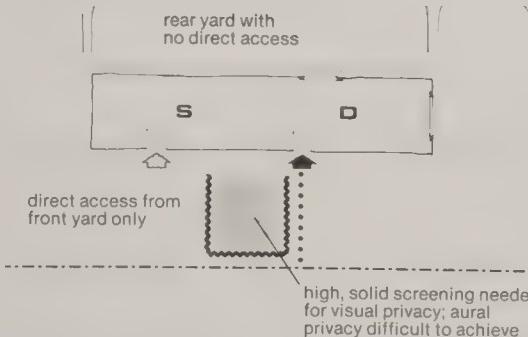
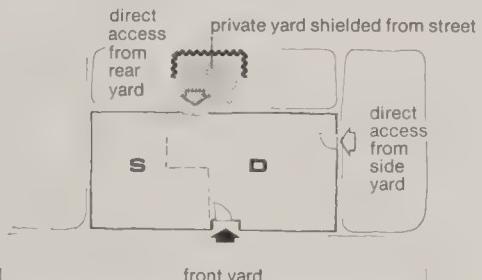


Where there is no direct access to a rear yard, front yards can be used for activities. They can be screened for privacy.

A wide lot will be necessary with parallel orientation to accommodate the long length of single-wide or expandable mobile homes.

Parallel orientation may be most appropriate in areas of the province where land costs are relatively low and particularly where scenic value is high.

Parallel orientation will be more suitable for double-wide homes in those areas of the province where land costs are high.

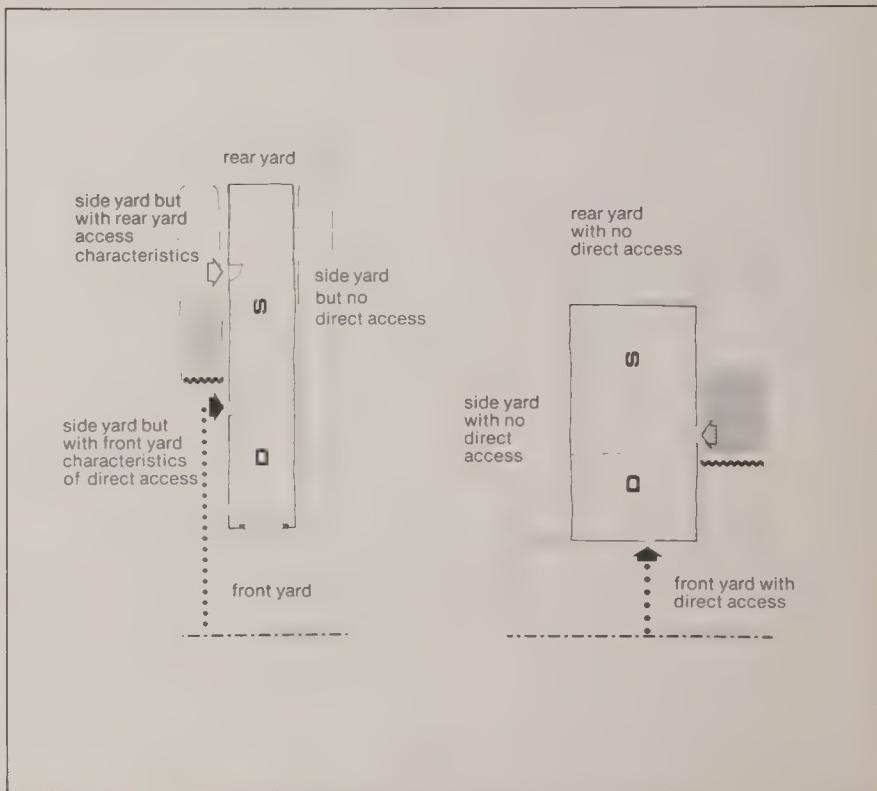
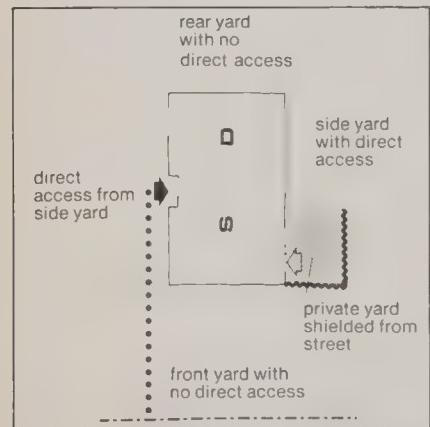


### Perpendicular Orientation

When single-wide and expandable mobile homes are placed with their long axes at right angles to the street the side yards become longer than the rear and front yards. Since the doors are on the long sides, single-wide mobile homes are entered from a zone which grants more privacy from the street than when oriented parallel. However, the side yards are on view from the street unless screened.

There is no 'front', 'side' and 'rear' yards in the traditional sense since their functions are less clear. The 'side' yard may contain the main entrance and activities which are most common to the 'front' and 'rear' yards in other single-family detached housing projects.

There are advantages, however, in terms of frontage costs.

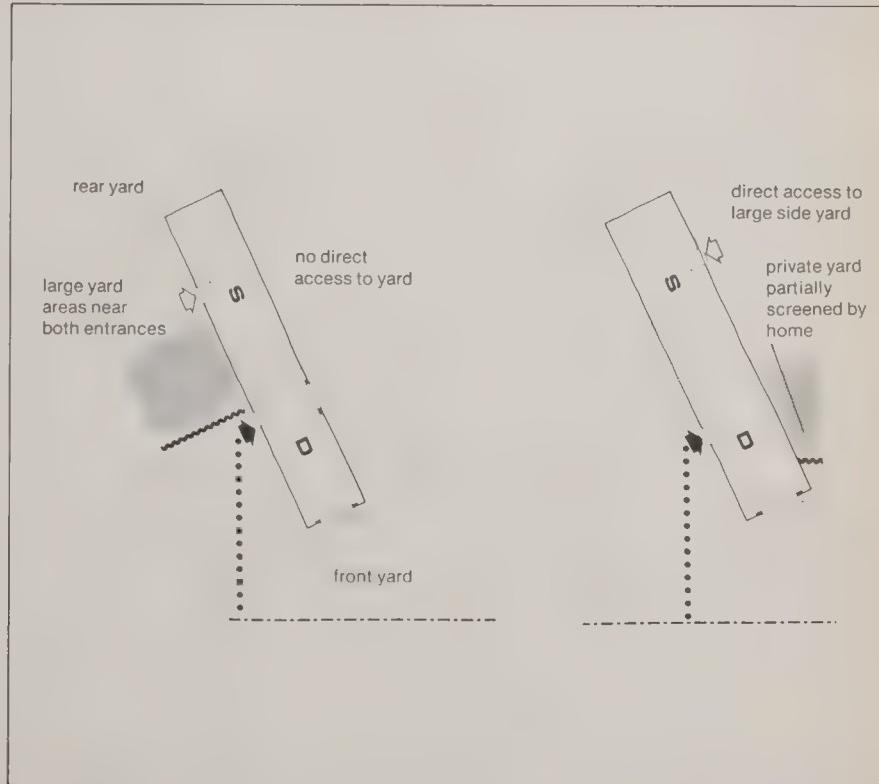


### Diagonal Orientation

The angle between the long axis and the street line influences yard areas in diagonal orientation. As the angle approaches 90° the orientation more closely resembles perpendicular siting. Conversely, an acute angle causes the orientation to resemble parallel orientation.

If the main entrance is on a long side of the house, diagonal siting enables it to be more easily identifiable than with perpendicular siting. It is also less exposed to the street than with parallel siting.

Yards take on different configurations with rectangular or parallelogram-shaped lots. In both cases the front and rear yards are irregular in shape.



### Reversing Models on Lots

In some instances it may be advantageous to 'reverse' mobile homes on lots, or site the home so that daytime areas of the home face away from the street. It may be desirable, for example, adjacent to the perimeter of the project so that large windows can capture a view of a grove of trees or a lake.

If carefully handled the technique offers many possibilities.

With reverse siting private outdoor living areas could be adjacent to daytime areas and also be set well back from the street.

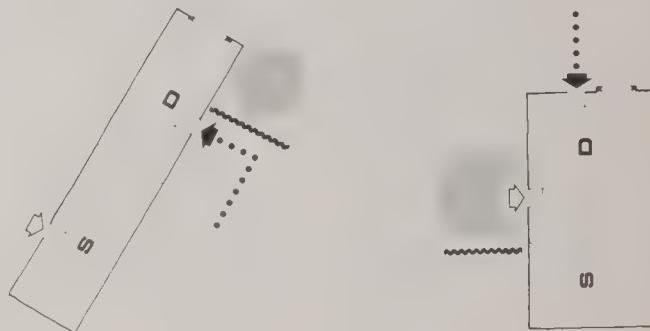
The location of entrances is important. Although the secondary door in the 1st example is nearer the street, the main door is the one which is visible.

In the second example the secondary entrance needs screening so it is not visible.

In reversing some models of homes the main entrance would not be visible. This is seen in the 2nd example. Such a siting would not be advisable unless a walkway system is conveniently located near the main entrance as an alternative to one adjacent to the street.

A bedroom that is near the street may be subject to noise that is generally more tolerable for daytime areas and a greater setback may be advisable.

Privacy screening of bedroom windows may also be desirable in some instances.



#### 4. Separations For Privacy

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Privacy within the context of site planning implies a limited level of noise and a minimal amount of visual intrusion.

While privacy within a family or household is desirable at times, its provision is beyond the scope of these guidelines. In site planning the provision of privacy to a household is of greater concern than *within* a household.

To this point the importance of privacy has been stressed in terms which suggest that a lot can be relatively isolated. The emphasis will now change and the consequences for privacy and openness for two or more neighbouring units will be considered. This discussion will provide the foundation for Part IV *Planning Groups of Mobile Homes*. This topic also is instrumental in determining lot sizes.

Standards should be adapted which provide for reasonable levels of privacy. This can be achieved through a combination of spacing, lot size, landscaping, etc.

It is recognized that some compromise may be necessary where land costs are high.

A survey of residents in selected mobile home projects in Ontario conducted in 1973 noted

*satisfaction with the distance the (mobile home) was set back from the road varied directly with the distance and it would appear that the critical distance was approximately 20'\*\**

This finding suggests 6 m (20 ft) are necessary to adequately separate the private area of the home from the public area of the street. As previously discussed land ownership and local standards may influence the design.

A recent study of the acoustical characteristics of newly constructed mobile homes has shown that the construction of these homes is, in terms of sound isolation performance,

*'... marginally less than for woodframe construction with wood or metal siding exterior (several decibels) and significantly less than for woodframe construction with brick veneer exterior (up to 10 decibels).'*

This marginal difference in acoustical performance becomes significant when the wall of a mobile home contains a window. A window reduces the acoustical isolation of the interior. It is greatly reduced if the window is open. This is also true in most forms of construction.

Loud sounds — television, recorded music, a baby's cry — are carried to the exterior; noise of a lawnmower or raised voices from a barbecue party are conveyed inside.

To achieve the same degree of acoustical isolation in neighbouring mobile homes as in homes of woodframe construction with siding, the spatial separation between recently constructed mobile homes would have to be 1.6 times that of the other type, where closed windows face each other in both cases.

Sources of noise (windows and patios for example) should be separated and/or screened sufficiently to secure a tolerable level of sound.

Because privacy is particularly difficult to maintain at large windows and main entrances additional protection should be provided when they are directly opposite each other. In many mobile homes the main entrance is especially vulnerable because there is no vestibule.

\*Urban Design Consultants, *Mobile Home Park Study*, p. 207.

\*\*Appendix C contains the report *Noise and the Mobile Home* prepared by Acoustics Canada Ltd for the Ministry of Housing.

<p>Aim: provide privacy by supplying suitable separation between habitable portions of a mobile home and lot and external influences.</p>	
Situation	Guideline
<p>a survey of mobile home park residents showed there was less dissatisfaction with siting when the home was set back from the street over 6 m (20 ft)</p> <p>the need for privacy will be less in non-habitable portions of the mobile home or additions to it (porches, platforms, decks, storage areas)</p>	<p>provide a separation or setback of at least 6 m (20 ft) between the travelled portion of a street and any habitable portion of a mobile home or addition.</p> <p>increase this distance where problems might occur (dust, location of services, parking or sidewalks)</p>
<p>the street is a public area, the home is private</p> <p>other public areas in a housing project include visitor parking, recreation and administration areas</p>	<p>provide a separation of at least 6 m (20 ft.) between the habitable portions of a mobile home and public areas such as open space.</p> <p>provide a greater separation as needed (a playground, large parking areas, etc.)</p>
<p>sometimes not all parts of a project are planned at the same time</p>	<p>provide a 6 m (20 ft.) separation between any habitable portion of a mobile home and areas whose use has not been determined</p>
<p>sitings in which mobile homes have no windows opposite each other a separation equal to that used for housing of other construction would be suitable for acoustical purposes</p> <p>a minimum separation between homes of 2.5 m (8 ft.) is a commonly acceptable separation over much of Ontario</p>	<p>provide a minimum spatial separation of 2.5 m (8 ft.) between walls, or portions of walls, of mobile homes which contain no windows</p>
<p>a window which faces a blank wall needs adequate separation for light, ventilation and view</p>	<p>provide a minimum spatial separation of 3 m (10 ft.) between a wall, or portion of wall, with windows and a blank wall opposite.*</p>
	<p>continued</p>

\*See also Central Mortgage and Housing Corporation, *Site Planning Criteria for Housing on Small Lots in Comprehensive Planned Developments*, p. 6. This is the minimum separation space required where a habitable room window (in other than a living room) faces a blank wall of an adjacent unit.

continued

Situation	Guideline
<p>because of its area a large window needs more separation than a smaller window to take advantage of a view and to avoid a feeling of being enclosed</p> <p>a large window can form a successful link between a private yard area and the mobile home's interior</p> <p>a minimum width of 5 m (16 ft) is recommended in these guidelines for the width of a yard to contain a private activity area</p>	provide a minimum spatial separation of 5 m (16 ft) between a major window and any wall, or portion of wall opposite
<p>where both walls contain windows, the spatial separation between mobile homes should be 1.6 times that for wood frame construction with siding [1.6 x 2.5 m (8 ft)].</p> <p>an alternative to increasing the distance would be to erect a barrier for acoustical purposes but such a barrier might be overwhelming</p>	provide a minimum spatial separation of 4 m (13 ft) between two walls, or portions of walls, which contain windows
<p>private yard areas require as much visual and aural privacy as possible</p> <p>usable yard space is particularly important for mobile home residents because of space limitations in home</p>	<p>separate private yard areas from public areas by a minimum distance of 6 m (20 ft) where feasible</p> <p>separate neighbouring private yard areas as much as possible</p> <p>relate adjacent homes so parts of yards which might contain much activity, are separated as much as possible from windows of neighbouring homes</p>
main doors or large windows which are directly opposite each other are especially vulnerable to intrusion, both visual and aural	use screening to separate major windows or main entrance doors of neighbouring mobile homes where desirable



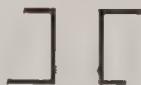
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(20')



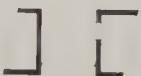
6.0 m +  
(20')



*The separation from the edge of the street should be at least 6 m (20 ft). Consideration for local standards such as the design of the street boulevard and the presence or absence of a sidewalk affect this distance.*



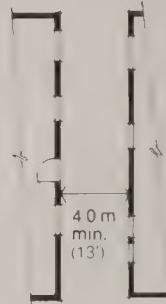
2.5 m min  
(8')



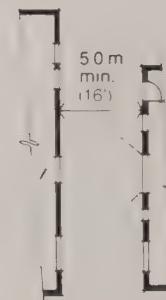
3.0 m min  
(10')



5.0 m min  
(16')



4.0 m  
min.  
(13')



5.0 m  
min.  
(16')

*More efficient use of land can be made if the site is planned according to the design features of adjoining mobile homes.*

## D. Design of the Lot

### 1. Lot Size and Shape

The size of a lot should be sufficient to accommodate the mobile home, any expansion, accessory building, and areas for specific activities or uses, while acting as a buffer against unwanted intrusion. The shape should allow distribution of space efficiently once the mobile home is sited.

Standards for the development of lots in housing projects are often presented in terms of the minimum size(s) which could effectively accommodate all these things and the shape(s) of lot in which they could be done. The indiscriminate use of a minimum size and shape does not take into account the way in which the building interacts with surrounding space and other buildings, and can lead to repetition and monotony. Instead, consideration should be given to the performance of the siting in relation to residents' needs. This should produce an economical lot size and satisfactory living conditions.

Use of the zero lot line technique is a prime example of economy coupled with performance. An exterior wall is placed on the lot or plot line, eliminating a side yard. The home unit and yard areas are strategically located relative to neighbouring homes and yards. Thus windows won't overlook, or doors won't open directly onto an adjoining yard depriving residents of privacy.

Under some circumstances lot lines may actually be established after the homes are sited, with access along the lot line for which there is no setback guaranteed through an easement.

It cannot be emphasized too strongly that designers of mobile home projects and municipal representatives should avail themselves of the opportunities to provide alternative site planning solutions.



*Bear in mind that the appropriate spatial separations may also be determined by factors other than windows — in this case the separations should be increased to 3.7 m (11 ft) because of the setback necessary to accommodate the door.*

*Closed doors do not affect the acoustical performance of a wall to the extent that windows do because of their construction.*

*Screening is probably desirable to separate major windows, doors and patios which are opposite each other.*

*Screening for visual purposes may not also satisfy acoustical requirements. In order for both homes in this example to be protected from noise while the windows are open the barrier would have to be 1.8 m (6 ft) higher than the listener (See Appendix C).*

In particular, solutions should take into account the differences between the types and models of mobile homes. Uniform siting should be avoided. The lot sizes may vary widely and still fulfil the aims of site planning expressed throughout these guidelines.

One purpose of this topic is to emphasize that, when faced with the selection of a mobile home, considerations should include the suitability of a model for a particular site. The reverse situation may also be encountered: selecting a site for a particular model.

In evaluating the sizes of lots for mobile home projects there are options for the project's designer and municipal officials to consider. Obviously a small lot will be limited in its flexibility to accommodate expandable or double-wide models, additions or wider single-wide mobile homes.

Larger lots can accommodate different types and models of mobile homes and allow a particular household to adapt a basic mobile home to its changing needs, including the size of family, through the use of additions and adaptation of yards.

### Examples of Lot Siting

The following examples of individual lot siting are exploratory. They are intended to be starting points for use in conjunction with the design or analysis of larger groups of homes.

The purpose of presenting the following examples of mobile home siting on lots is to illustrate the process involved in arriving at possible siting solutions, using different types and models of mobile homes in conjunction with such variables as orientation and setback.

Undoubtedly there are other lot sizes and shapes just as suitable for that particular model and type of mobile home.

*The emphasis is on the rationale inherent in the examples. Once this is thoroughly understood, it can be applied to a particular situation within the context of the lot's surroundings.*

The reader should recognize that for the sake of demonstration street setbacks are standardized while major yard areas range upward from a minimum of 5 m (16 ft.).

Spatial separations to the neighbouring mobile home are given where appropriate.

#### LOT 1

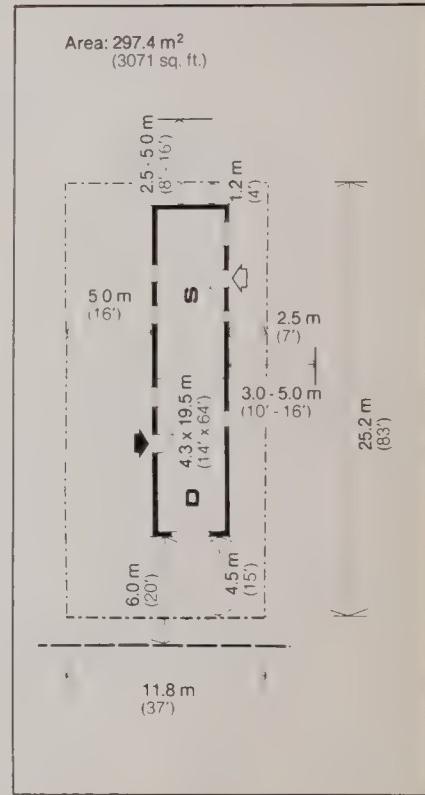
In the first example a typical 4.3 by 19.5 m (14 by 64 ft.) single-wide mobile home is sited perpendicular to the street. The home is set back 4.5 m (15 ft) from the street lot line, although the distance to the travelled portion of the street should be at least 6 m (20 ft).

The yard in which most activities will take place is adjacent to the side of the home containing the main entrance. It is the minimum suggested width of 5 m (16 ft.). It is assumed that screening would be used to create private and semi-private areas.

The 2.5 m (7 ft.) yard near the secondary entrance could accommodate limited activities.

This portion of the home should be separated from a neighbouring mobile home by 3 to 5 m (10-16 ft.) which would be determined by the location of windows.

It may be more convenient to refer to this lot as 12 m by 25 m, or 300<sup>2</sup>.



## LOT 2

In this example the same model of mobile home is sited parallel to the street. The major activity area is situated away from the street with access via the secondary door

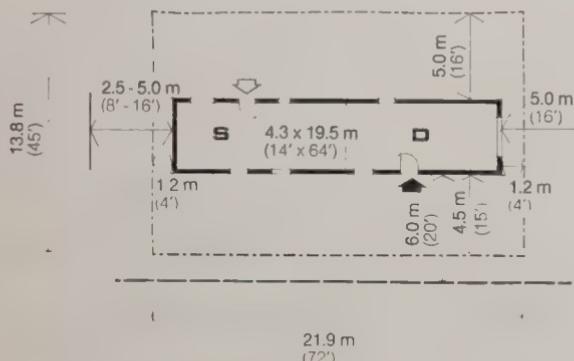
It would not be possible to provide off-street parking entirely on the lot; it would have to be partly within the street right-of-way

Lot 2 could be more easily referenced as 22 m by 14 m and 308 m<sup>2</sup> in area

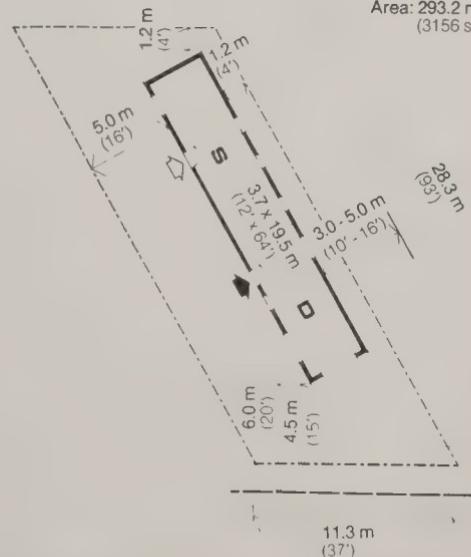
## LOT 3

This lot accommodates a mobile home which is 3.7 x 19.5 m (12 by 64 ft.) and has both doors on the same side. The home is sited diagonally to the street with convenient access to the large general yard area.

Area: 302.2 m<sup>2</sup>  
(3240 sq. ft.)



Area: 293.2 m<sup>2</sup>  
(3156 sq. ft.)

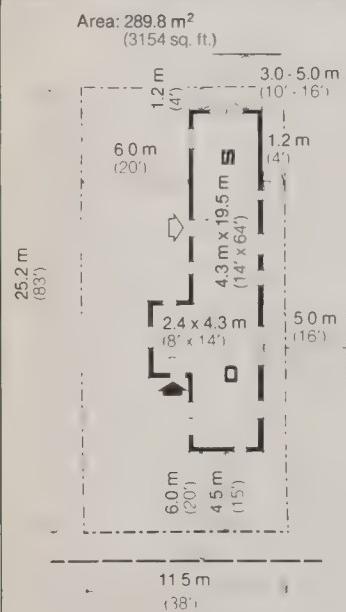


LOT 4

In example 4 an expandable mobile home or a single wide with an addition is in a position which is perpendicular to the street.

The major yard area width is 6 m in this case because of the location of the expansion.

The lot would approximate 115 m by 25 m and 300 m-

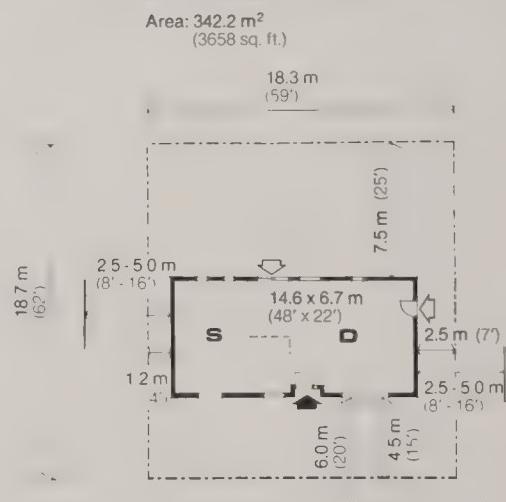


LOT 5

A double-wide 14' 6" by 6' 7" m (48 by 20 ft) in size, is sited with the long axis of the home parallel to the street.

The lot has a rear yard of 7.5 m (25 ft).

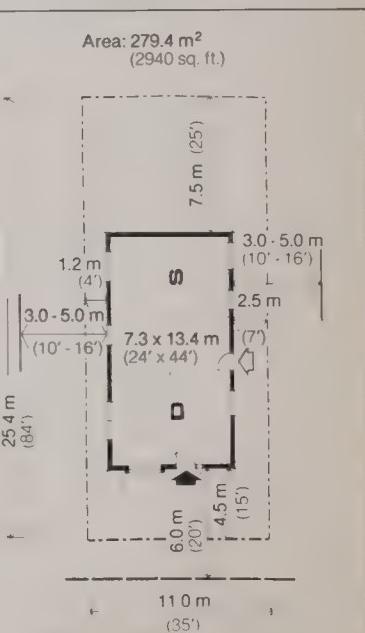
For the sake of convenience the lot can be referred to as 18.5 by 19 m in depth and 352 m<sup>2</sup> in area.



LOT 6

This double-wide model has the main entrance on the short end so that the home can be sited with the long axis perpendicular to the street.

Lot 6 can be referred to as an 11 by 26 m lot, 286 m<sup>2</sup> in area.



## 2 Landscaping/Grading

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A residential lot which is attractively landscaped and well maintained has popular appeal. It can be a source of enjoyment for residents and neighbours alike.

Elements of landscaping are also functional. For example, soil protected by a suitable ground cover in combination with proper grading should provide good surface drainage. Trees, fences, hedges and some land formations can offer shelter from wind, sun, blowing snow and rain.

Because the components of landscaping offer a wide range of textures, colours, sizes and opaqueness they can be a powerful design tool. Characteristics of the home or individual site can be masked or accentuated. Feelings of openness or enclosure can be created.

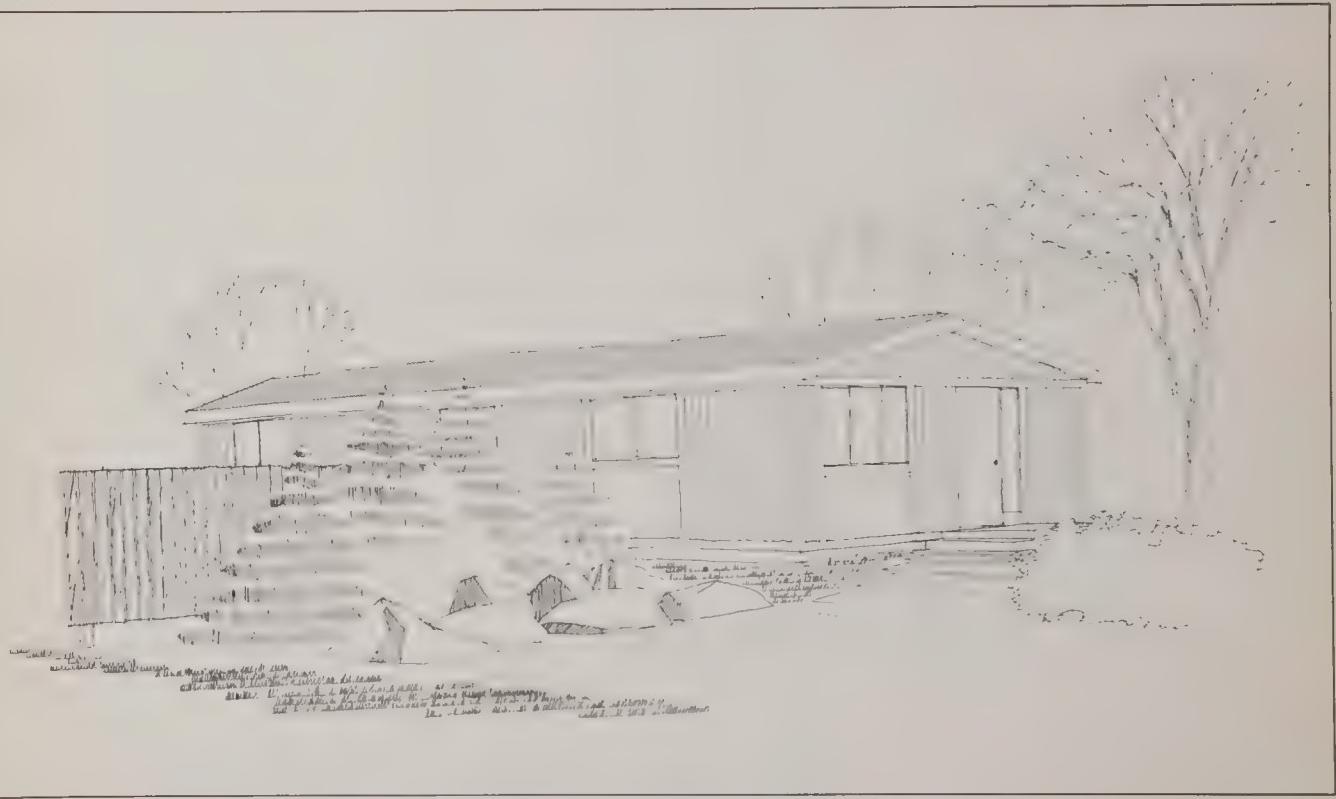
The landscaping principles which are applied within a mobile home project should be those generally appropriate within any housing project, highlighted by some which concentrate on specific aspects of mobile homes.

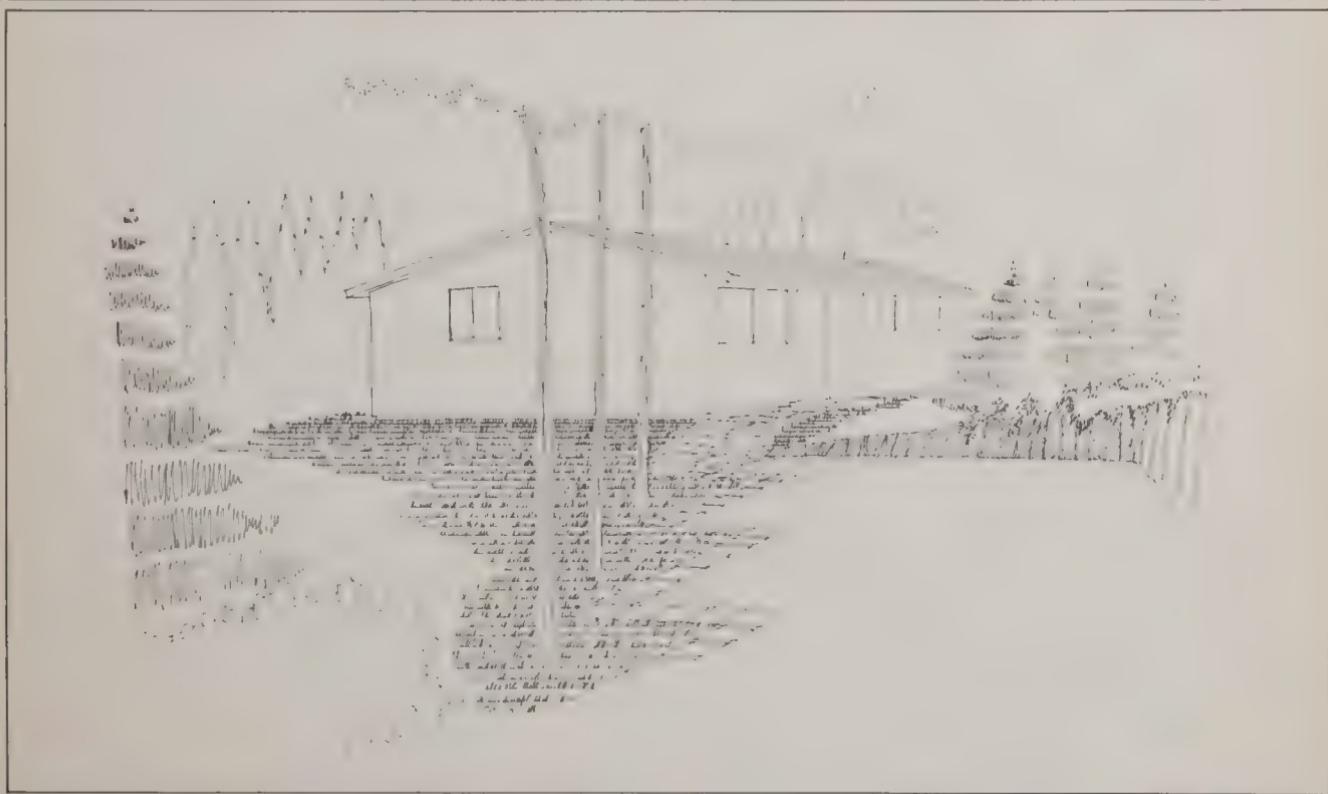
The issues discussed within this topic can be useful at different levels. Some suggestions for landscaping might be incorporated in the original design, while others could become the responsibility of management or residents.

While sodding is generally associated with well-landscaped residential lots there are alternatives for ground cover such as gravel, rock outcroppings, decking and forms of vegetation such as ivy.

The important things to consider are the ease of maintenance so the area appears well-cared for; the durability of surfaces relative to their use, and the definition of borders between different materials or textures. Loose material should be confined at the edges.

Aim apply general principles of landscaping to individual lots in a mobile home project.	
Situation	Guideline
ground cover will be more durable if it is appropriate for the intensity of use of particular portions of the lot	provide parking areas that have a durable surface (gravel, concrete, asphalt) construct paths of material which will withstand wear (concrete, paving blocks, bricks) surface a portion of private yard space which will accommodate furniture (paving stones, bricks, decking)
on smaller lots outdoor activities will probably be concentrated in certain areas	relate the general ground cover to the size of yards and intensity of use — the smaller the lot, the harder the type of grass.
young, active children will probably cause more wear and tear of general surfaces than adults	in projects designed for families with children cover general yard and play areas with a hardy surface
large areas of hard surfaces can cause excessive run-off of water normally absorbed by soil which would nourish vegetation	do not cover entire lot with hard surfaces which create excessive water run-off provide some areas with vegetation (grass, gardens)
a well-drained site can be used more frequently	use a system of grading which allows surface drainage to be carried away from the home, integrated with a project-wide drainage system
attractive surroundings will encourage more frequent use of yard	accentuate or retain natural features such as mounds, depressions and vegetation provide distinct edge between different types of surfaces for sake of appearance and preservation of surfaces.
a safe site will prevent unnecessary accidents	gently slope paths for safety and ease of travel





Other topics have outlined the importance of screening for privacy at strategic points — near large windows or around a patio, for instance. Areas of the yard which could look untidy, should also be screened.

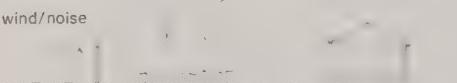


Fences, hedges, etc., used for screening would have to be above eye level to screen for visual privacy.

Consider the angle and the distance over which elements of landscaping will be seen. A lower barrier close to the point of vision might achieve the same degree of privacy as a higher one closer to the object to be shielded.



A short barrier close to the area to be shielded can achieve the same objective as a longer barrier adjacent to the path of vision.



A cluster of dense vegetation will dampen the transmission of noise to a minor degree only. A barrier near the noise source will be more effective if it is of a solid, dense material.



Earth berms can provide some protection by deflecting noise and wind.

Aim: accentuate or soften features of the building.

provide differences in appearance to give the illusion of variety.

Situation	Guideline
the textures, colours and forms of trees, shrubs and most fencing materials are in sharp contrast with the rigid appearance of many mobile homes	use vegetation and screening to give feeling of depth and to soften appearance
the length of many mobile homes is much greater than the width	relieve appearance of excessive length by judicious placement of vegetation and/or fencing where desirable



Vegetation and structures such as fencing placed at right angles midway along the long side of the home make the home seem shorter and wider. Tall trees provide breaks in the low skyline of a mobile home project

Variety in the texture and colour of foliage can produce startling contrasts. The soft character of vegetation helps to relieve the smooth, metallic surfaces of mobile homes

Situation	Guideline
most people like to adapt their home territory to reflect their tastes and individuality	vary vegetation, screening, fencing, (gardens, hedges, arbors, etc.) between mobile home lots according to individual taste
there may be limited opportunity to adapt many mobile homes which have similar characteristics	
the boundaries of a lot may not be clearly defined	use landscaping elements such as fences and hedges to mark the boundaries of each lot when desired by residents



open ← → solid

Different materials and methods of construction can be used for fences and walls to achieve different effects in

- air movement
- reduction of noise transmission
- visual screening
- aesthetic impact (through choice of materials and method of detailing)
- texture and colour
- delineation

## PART IV

### PLANNING GROUPS OF MOBILE HOMES

A.	Basic Planning at the Group Level .....	79
1.	Shared Space and Facilities .....	79
B.	Examples of the Implications of Site Planning on Adjoining Lots .....	81



## PLANNING GROUPS OF MOBILE HOMES

Part IV highlights the implications of planning for a small number of mobile homes. The effects and influences of adjacent homes and lots cause interacting spatial relationships which should be appropriately reflected in site design.

While Part III treated a mobile home and lot in relative isolation the emphasis here is on mobile homes which are immediate neighbouring dwelling units — that is a 'group' consisting of two to four mobile homes which share common boundaries or lot lines.

This part also forms the basis for discussing segments of a mobile home project. First, the format common to Part III topics is used to discuss 'Shared Space and Facilities'.

Then a series of examples is used to illustrate items of concern in the planning or evaluation of mobile home projects.

### A. Basic Planning at the Group Level 1. Shared Space and Facilities

Some space within a group of residences is commonly shared, notably sidewalks and streets. Other spaces and structures can be shared if they are conveniently planned and located; for instance, a parking area, driveway, storage building or play yard.

For best results such space and facilities should be capable of easy maintenance. Obviously the management of shared facilities is simpler in a park than in a subdivision.

Such sharing of facilities offers opportunities for informal meetings between neighbours. They do not need to lead to infringements on privacy however. Most residents will want to feel a sense of freedom while using the space surrounding their homes at the

same time as maintaining friendly relations with neighbours.

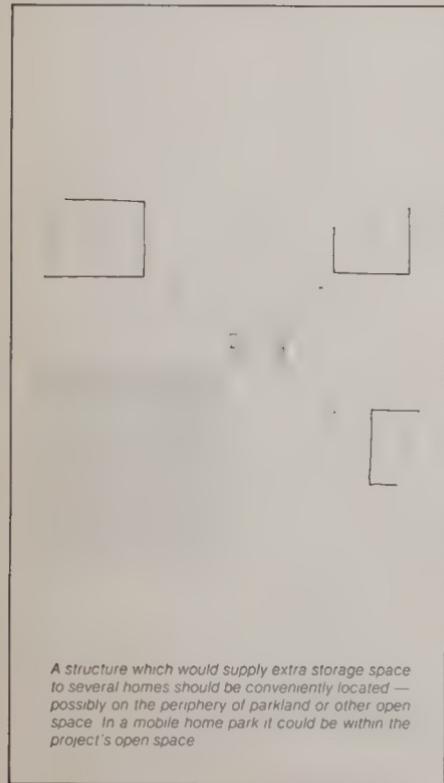
The number of homes which could make use of a shared structure for storage would relate to its design and location. As many as half a dozen might be feasible.

Storage structures should be appropriate to their surroundings in terms of scale, materials and colour.

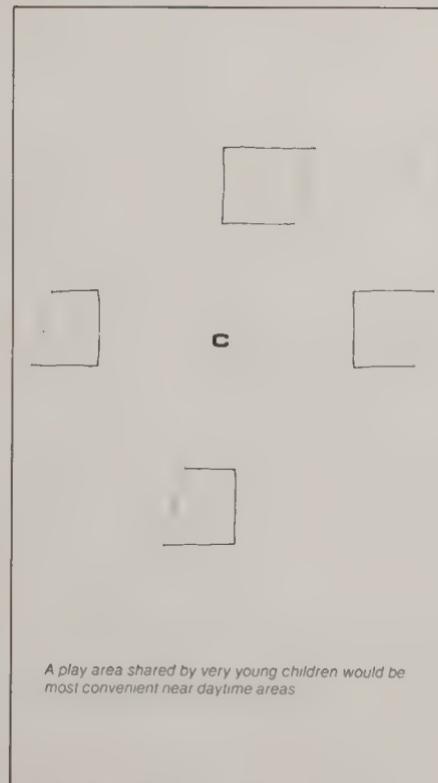
Households with young children could share a play area which might contain equipment such as a sandbox or swing. Play areas of this kind, since they are intended for the informal use of only a few households, would not be included in any requirements for open space or recreational facilities in a project. Such space is virtually an extension of the adjoining lots.

**Aim:** investigate and evaluate the possibilities of shared spaces and facilities.

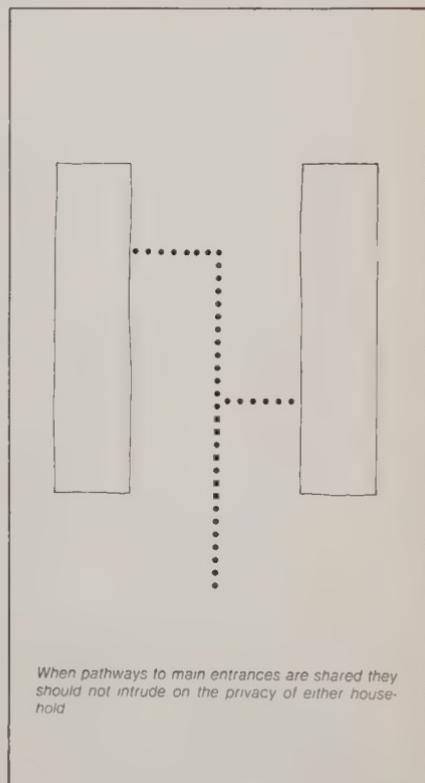
Situation	Guideline
in mobile home parks the responsibility for maintenance is usually with management in which case it may be efficient to have shared facilities.	explore siting arrangements in which parking areas, driveways and/or children's play areas are shared
there is usually a need for additional storage space for each household outside the dwelling  a storage building which serves several homes eliminates the need for a small structure on each lot.	where appropriate, provide a storage structure which contains lockers for several households and locate it so each household has easy access
some areas can be commonly shared as they are in other forms of single-family housing	explore siting arrangements around a common yard, e.g. courts or quadrangles.



*A structure which would supply extra storage space to several homes should be conveniently located — possibly on the periphery of parkland or other open space. In a mobile home park it could be within the project's open space*



*A play area shared by very young children would be most convenient near daytime areas*



*When pathways to main entrances are shared they should not intrude on the privacy of either household*

## B. Examples of the Implications of Site Planning on Adjoining Lots

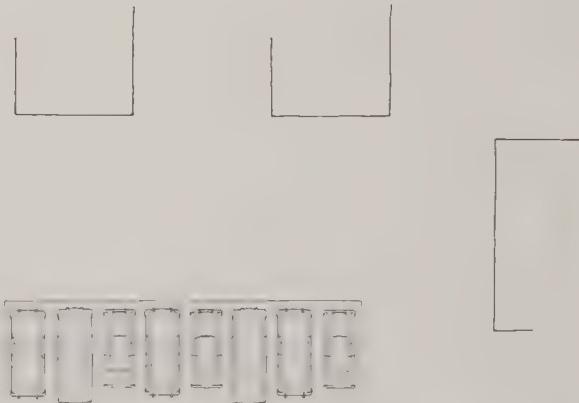
81

To illustrate the effects relevant to site planning that neighbouring homes and lots can exert upon each other representative groups have been selected. The comments focus mainly on the interactions between the homes and lots rather than on influences from outside the lots such as from the street.

In the diagrams many features of the mobile homes are explicit but features of the lots are not. For example, dense screening is essential in creating most private areas but is shown only diagrammatically since a variety of solutions exist (fences, walls, vegetation). Covered porches and partial screening can be used to create semi-private areas.

Screening is indicative of the general area that needs protecting. This is particularly true for window areas. In some instances screening at some distance from the window may be just as effective and more desirable than screening directly in front of the area.

It should be stressed that the groups and the approach to their evaluation should not be used indiscriminately without considering the actual project, the natural vegetation, terrain, standards of development and design of the street area.



*Shared parking areas could provide spaces for both residents and visitors*

## GROUP 1

Two single-wide mobile homes are sited perpendicular to the street. The doors are similarly placed in each home but the locations of windows vary. One home has a deeper setback from the road than its neighbour. They are separated by the distance necessary to contain a major yard and maintenance strip.

*The main door of home b does not face a window or door which is desirable*

*Screening is used to*

- separate the secondary entrance of home b and small windows in home opposite
- shield private yard areas and secondary entrances from street

*Private yard area for home b is large when screened*

*Lot demarcation between homes can be defined by fences or vegetation*

*Access to service lines is relatively efficient*

*Off-street parking is convenient and clear of pathways although only one space can be provided on the lot*

*The pedestrian link between the home and a route along the street is direct*

*The sitings do not promote shared spaces and facilities, but the close spacing and relatively high density provide ample opportunity for informal contact between neighbours*

*The screening necessary to secure privacy results in a lack of spaciousness and a feeling of enclosure.*

*Some variation is provided by the difference in setbacks and use of screening*

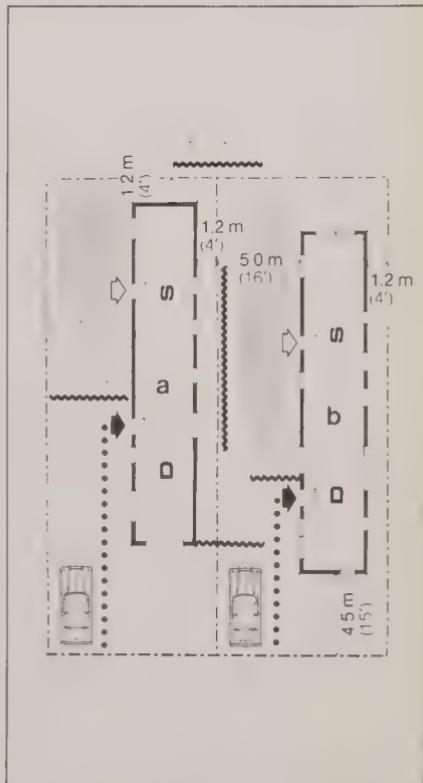
*A windbreak may be needed to counteract the tunnel effect between the two homes if exposed to harsh prevailing winds*

*Any additions should be made with caution so that usable yard space is not substantially depleted*

The relatively small enclosed lots should be balanced by open space in the larger segment and the total project

The repetitive use of this particular group is not recommended

This group would be most suitable along a straight section of road on a relatively flat site



## GROUP 2

Two distinct types of mobile homes are also sited differently. The double-wide home is parallel to the street — the single-wide perpendicular.

The street set-backs vary.

The separation between the homes makes allowance for access to the secondary entrance of home **a** and for a yard of sufficient width on lot **b** to permit two cars to park.

*The main door of home **b** is screened from the secondary door of home **a**.*

*Lot **b**'s private yard is linked to a main window and the main door.*

*The patio within lot **b** is near a neighbouring wall with no windows which is desirable for aural and visual privacy.*

*Screening along the common lot line has a dual function — it shields the main yard areas and defines the lots' border.*

*Both lots are designed to make use of the zero lot line concept.*

*The setback from the street is correlated with parking requirements and the location of main windows.*

*Homes could be expanded at the rear and still retain a sizable yard.*

*It would be possible to share a storage structure or clothes line at the rear of the lots.*

*Both homes have large windows overlooking the street which could take advantage of distant views.*

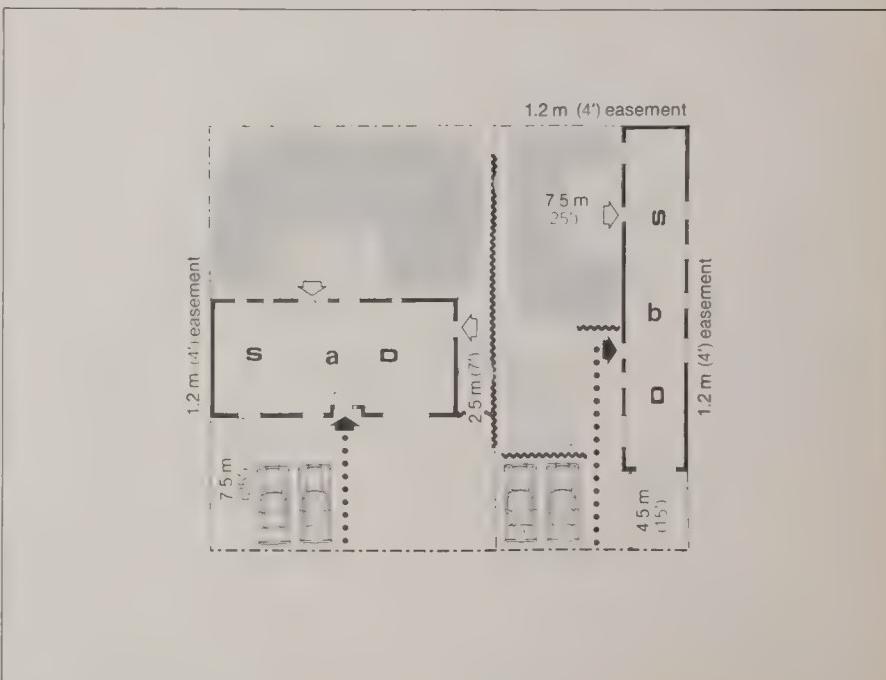
*Both lots are relatively spacious.*

The use of two homes different in their orientation and sitings and use of screening would provide variety in appearance.

Such a group could be injected into a project with some

frequency, perhaps providing breaking points in other settings.

Variations of this group could easily adapt to changes in topography.



**GROUP 3**

Two similar mobile homes are sited diagonally to the street. The long axes of the homes are parallel but the short sides are not in the same plane

*Main entrances and large windows are obliquely exposed to the street*

*Large windows face the street not neighbouring homes*

*This siting permits the main entrance of home **b** and the secondary entrance of home **a** to be beyond the plane of the next home*

*The common lot line is staggered to allow lot **a**'s private yard to link with the secondary entrance*

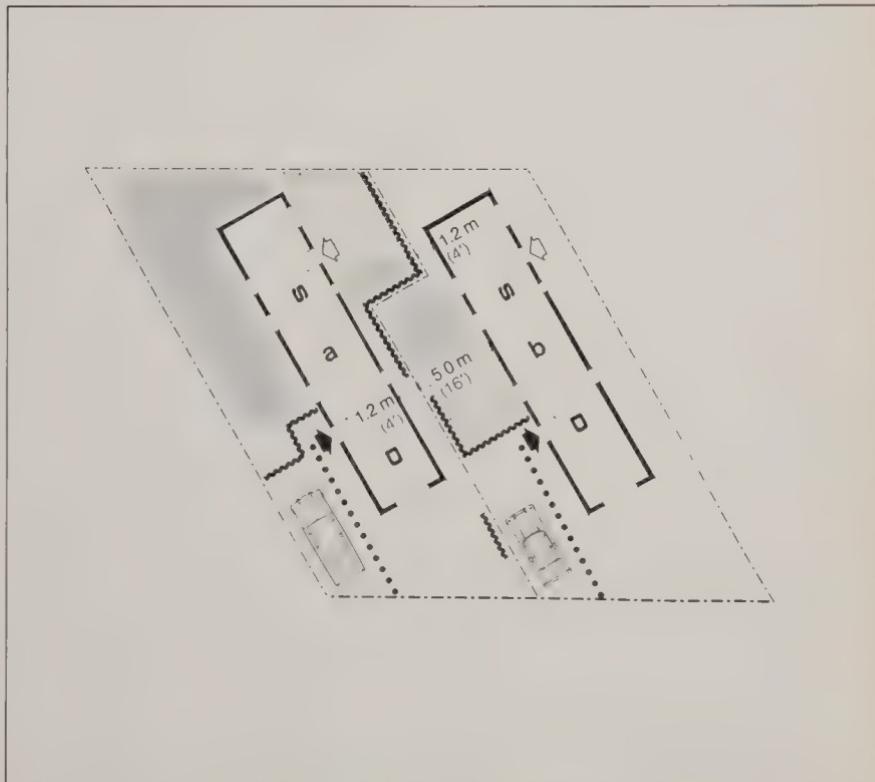
*Private yards are separated as much as possible*

*Screening along the common lot line shields private yard areas as well as entrances and windows*

*Parking is parallel to the homes but diagonal to the street, it is separated from the pathway and is nearest a blank wall. However, it might be visible to the neighbours. This could be remedied by screening*

*Sleeping areas are vulnerable to factors at the rear of the lots because of their exposure*

In general, diagonal siting makes efficient use of land and, although the single-wide homes are parallel the homes are less exposed to each other. There is variety in this group's appearance from the street



#### GROUP 4

Siting single-wide or expandable mobile homes parallel to the street can be costly since considerable street frontage is required. Reducing the length of frontage is a major factor in minimizing development costs.

In this group the *average length of street frontage* is reduced by having only one home front directly on the street. Lot *b* is designed with a 6 m (20-ft) wide access-way to the street and borders on public open space at the rear.

*The average length of frontage for lots *a* and *b* equals one-half the length of lot *a* plus 6 m (20 ft).*

*Lot *b* is substantial in area with most of it available for private activities.*

*Lot *b* could be readily adapted by residents into patios, gardens, etc.*

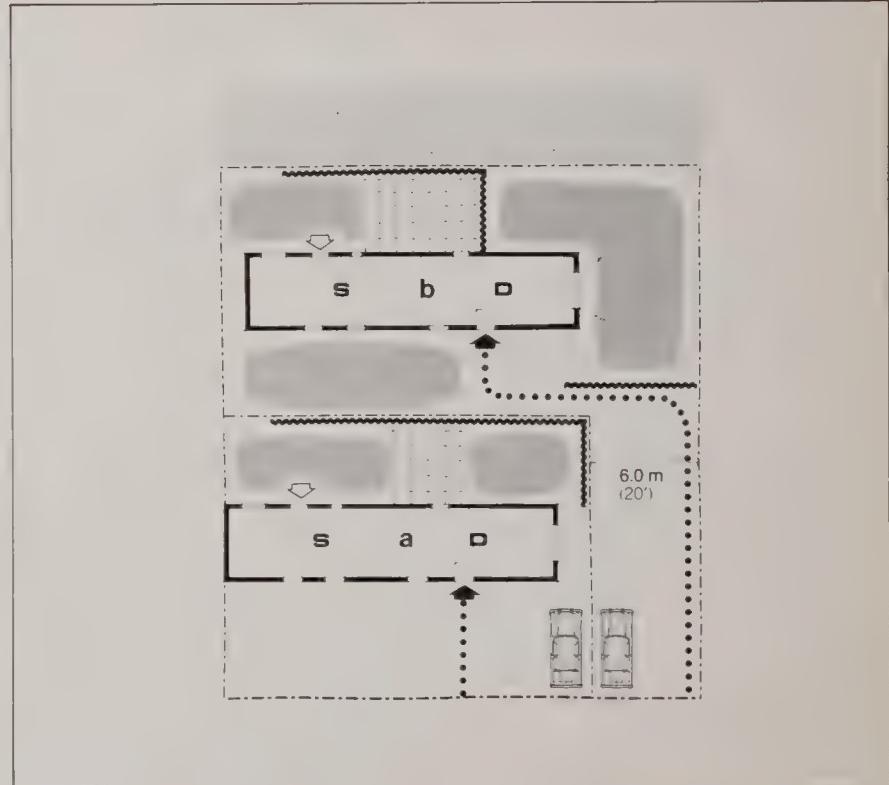
*Lot *a* is smaller in area with only the rear portion of the lot available for private activities.*

*Screening is required along the common lot boundary. Screening may be needed along open space at rear.*

*Parking area for lot *b* should be clearly defined and confined to street area. A long driveway would be a nuisance source for lot and home *a*. Screening helps shield and define area. Two cars could be accommodated on each lot.*

*The path to home *b* should be clearly identifiable and the address or name should be visible from the street. It should be separated as much as possible from large window of home *a*.*

*Services (water, sewer, gas, electricity) could be supplied from the street or from within open space.*



## GROUP 5

Two double-wide mobile homes are sited on lots which are similar in size and shape although the homes themselves are quite different

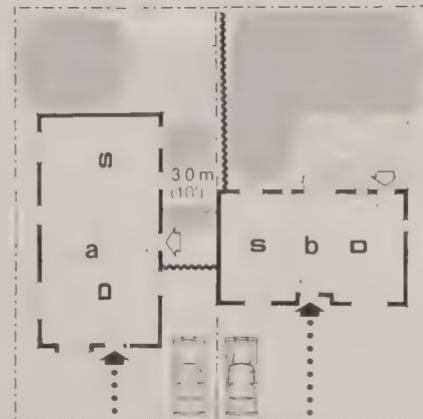
The spatial separation between the homes is that advised when one home has windows facing a blank wall

*Both homes have the private yard area at the rear of the lot*

*Screening at the rear denotes the boundary and provides visual privacy to each yard.*

*Acoustical privacy could be provided by screening of the proper density and equal to the height of the homes. It would protect the yard and windows of each home*

*An easement within lot a would provide access to maintain home b*



## GROUP 6

Two similar double-wide mobile homes are sited near an area which provides parking for both homes' residents.

Open space is to the rear of the homes

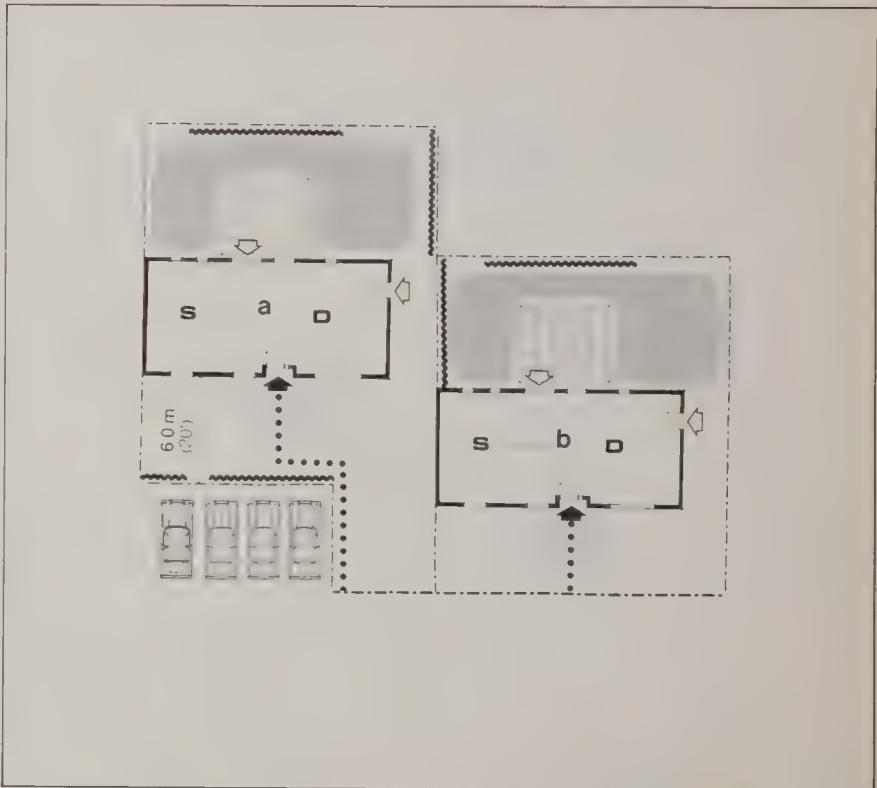
*The parking area is 6 m (20 ft) from both homes because of the number of cars it accommodates.*

*Screening may be desirable to shield the parking area from home a's windows and main door.*

*Additional screening will probably be desirable along the rear lot lines if the open space is in general use.*

Adaptations of this group could be used in projects where only a minimum amount of screening is acceptable.

It would be desirable in projects with a variation in topography, in which home a could be sited so that it is at a higher elevation than the parking area. The view from the front of the house could look over the top of the cars.



## GROUP 7

The interior area separating two rows of houses acts as a buffer zone. Because it is removed from the public character and hazards of the street it can accommodate many activities.

The type and extent of the activities would depend on the amount and shape of the space. In some instances the space can be shared — for facilities (storage or drying clothes) or activities (gardening or children's play).

Project walkways or bicycle paths would only be appropriate within a strip of public open space.

In Group 7 there is a relatively small block of land adjacent to each of the four lots which could be shared.

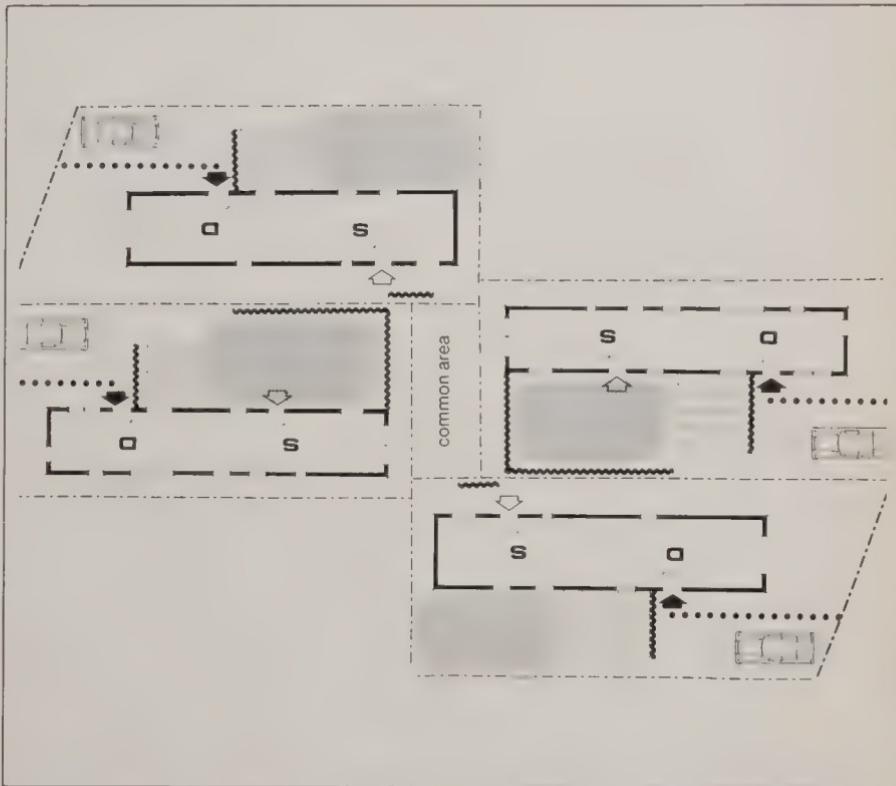
The homes are offset which prevents windows on the end walls from overlooking each other.

Offsetting rows of homes in this manner was found to be preferred by residents in a survey of mobile home projects.\*

The homes are sited diagonally to the street.

*Patios and private yard areas and secondary entrances are screened from neighbouring homes and the common area as well.*

*Because the common area is small and close to each unit its use should be one that is limited in the frequency and duration of time it is used, such as a garden.*



**GROUP 8**

Four double-wide mobile homes are sited so that the rear lot lines meet at a common point.

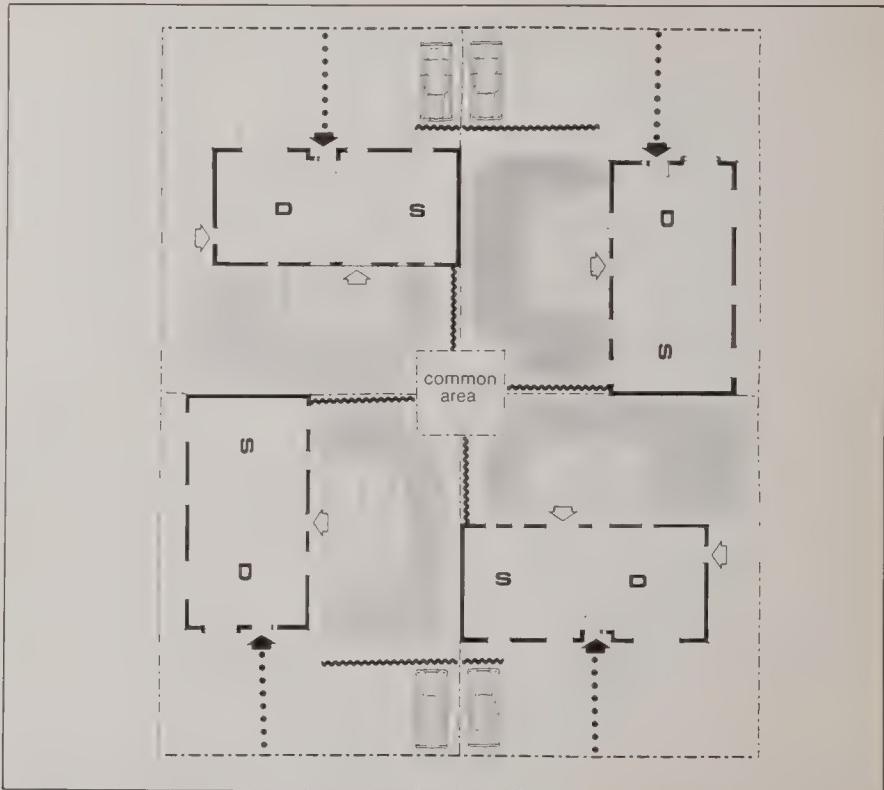
In this particular case the junction would be an ideal location for a storage structure.

Alternatively the space could be used for other things — a children's play area or clothes drying.

*The area is easily accessible for each home.*

*A storage structure would act as a screen between the homes.*

*Additional screening along the lot line would protect private yards.*





**PLANNING SEGMENTS  
OF THE PROJECT**

• Basic Planning at the Segment Level .....	93
1. Linkages .....	93
2. Appearance/Streetscape .....	94
• Examples of the Implications of Site Planning on Portions of a Street .....	97



## PLANNING SEGMENTS OF THE PROJECT

So far neighbouring mobile homes and lots have been reviewed. In this part segments of mobile home projects are examined. A segment is composed of a number of mobile homes which form a significant portion of a project

Segments have been selected to show variety. It should be possible to include several such segments or variations of them within most projects

Portions of street systems most often form the framework for those segments illustrated. This approach has been chosen because portions of a street are easily identifiable, convenient for examination and quite naturally form the skeleton of a project

Many can be adapted to other street patterns. Some segments, such as courts, which do not relate directly to the configuration of any street can be readily adapted to many sites

Two topics appropriate at this level — 'Linkages' and 'Appearance/Streetscape' — are discussed first

### A. Basic Planning at the Segment Level

#### 1. Linkages

The links or connections between interior and exterior activities and spaces, parking and access to the home, and between windows and views on an individual lot were examined earlier

At the segment level the linkages between movement patterns, various activities, and their spatial distribution are expanded

The overall aim in planning for linkages is to provide those that are appropriate for vehicular, pedestrian, recreational and open space systems. This can be accomplished by providing reasonably direct and efficient contact, eliminating congestion and interference.

Some linkages can be totally planned, for example, those that connect the local street and parking areas for individual lots. Another instance would be pedestrian movement through a network designed to link homes and facilities, such as a community centre or playground

At the other extreme are linkages which cannot be planned in total. It might be possible to control visual contact with attractive scenery at strategic points but not throughout a project.

## 2. Appearance/Streetscape

94

Because of their physical similarities particular attention should be given to the visual appearance of a number of mobile homes. The streetscape, or view from the street and sidewalk, is especially important because it is shared by the greatest number of people.

In spatially relating any group of objects some pattern is preferable to total disorder. At the other extreme consistent regularity is usually monotonous. In a housing development some semblance of order coupled with variety will produce more pleasant surroundings and also make identification of each home easier.

The geometric shapes of mobile homes — three dimensional rectangular, low forms — lend themselves easily to larger geometric patterns. Elements of siting such as landscaping and paths can be used effectively to soften the appearance of regimented segments.

The streetscape in a housing project should relate to the slow speeds of pedestrian and vehicular travel. There is a relationship between the speed of travel and what one sees — the slower the speed the more attention one gives to details such as changes in grade and the prominence of colours and textures.

For the most part, a mobile home segment or project in which double-wide mobile homes predominate will visually resemble an equivalent containing small bungalows.

Aim: add interest to the streetscape by siting segments in relation to the street alignment	
Situation	Guideline
a uniform street allowance with repetitious siting can be monotonous while a completely random pattern can appear chaotic.	enhance the spatial effects adjacent to a straight street by distinctly changing the siting patterns  provide siting patterns in which diversity is intentional but planned
a straight street with no contrasts or broken planes can be exhausting to look at and travel through	reduce the apparent length of a straight street by changing its visual character  create variety in the flow of space by changes in setbacks and siting patterns
a curved street provides a constantly changing sequence of views	create variety through the use of accents in landscaping  use some continuity, such as that provided by walls or vegetation, to smooth the transition along a curved portion of road when the siting patterns are similar
an uninterrupted view at a T-junction could be disturbing	provide a closure to a T-intersection which acts as a focal point

In a housing project which contains only mobile homes the skyline is low and uniform. The horizontal lines and planes of the homes are predominant. The stress of the horizontal and the illusion of distance is intensified as the spacing between homes is increased. Vertical planes of the homes can be made more dominant by decreasing the spatial boundaries of the street and adding vertical accents.

Aim: heighten the visual appeal of segments.	
Situation	Guideline
the low, long form of the mobile home results in an emphasis of the horizontal	provide a narrow street right-of-way  relieve the horizontal emphasis of the streetscape by the planting of vertical forms of vegetation such as poplars or pines
the automobile can be a prominent feature relative to the size of a mobile home.	design parking areas to be as unobtrusive as possible — by use of screening, changes in elevation, location, etc

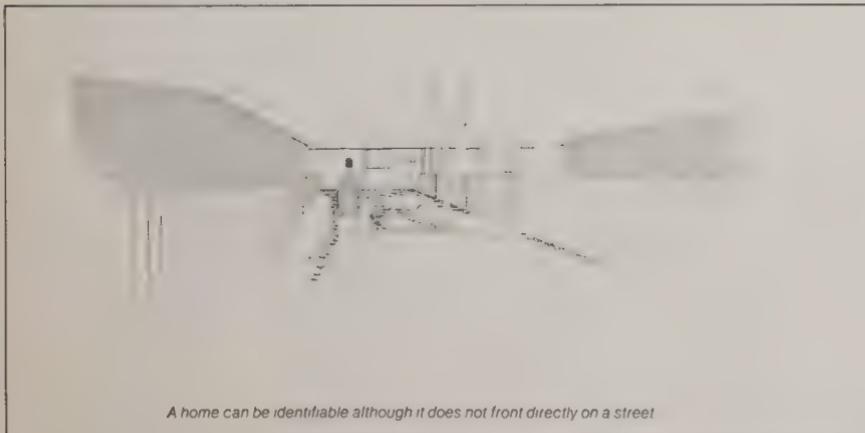
Some segment patterns adapt more readily than others to a diffusion of mobile home sizes, a mixture of mobile home types and variety in colours and details

Aim: encourage some individuality within each lot in a segment.	
Situation	Guideline
there are similarities in the characteristics of mobile homes in materials and details of construction	consider the result of using a mix of unit types and models within a segment
different types and models of mobile homes are available which vary in: • size • shape • colour • design features	encourage co-ordination of colours and features which are visually pleasing but avoid their large-scale use which would be monotonous.
most residents will want their home and lot to reflect their individual preferences	in general encourage variety in the treatment and landscaping of lots

Aim: unify each segment in a project by using cohesive elements.	
Situation	Guideline
total disorder in design can result in a chaotic appearance  extreme differences in repetitious elements can be disturbing	provide some underlying element of order in planning segments  use uniform street furniture, planting and fencing as cohesive elements  provide focal points such as a group of large trees, a community centre or a distant view for both the pedestrian and motorist
the same model type and colour of mobile homes in some siting patterns can be harmonious	similar homes should be used in segments which are rigidly sited

In general, with siting patterns where the alignment of homes is critical, units which are similar in size, materials, colours and details of construction should be used to avoid a haphazard appearance

Over an entire housing project landscaping can be used for quite different reasons — to make the area interesting visually by providing some diversity when the buildings are similar, or by bringing some semblance of order and cohesion when the buildings are very different.



## B. Examples of the Implications of Site Planning on Portions of a Street

97

*Changing the siting patterns and distances from the edge of the street can help create an interesting streetscape by avoiding uniformity in the flow of space*

*Structures such as walls, fences, garages, carports and storage sheds are prominent features. Throughout a segment they should be of compatible designs*



*Trees and street furniture can be cohesive elements when there is variation in types, models and colours of mobile homes*

A selection of examples of segments is shown which, for the most part, centre on portions of a project's street system. Included are straight, curved and looped streets, and culs-de-sac.

Although a number of alternatives are shown there are many other equally appropriate solutions. These siting arrangements should be used with discretion and should be adapted to the particular project.

Because of the variations in appropriate standards throughout the province a uniform street width and distance to the lot line is shown. This may be the street right-of-way boundary in some projects. In reality variations in standards also occur because of the type of street — a collector or local street, for example. In all instances of application reference should be made to local standards.

Repetitious comments have been reduced to a minimum. For this reason the examples should be studied in succession.

Diagrammatic symbols represent entrances, major

windows, walls without windows,\* paths and a patio. The patio represents the general area that could be adapted for privacy. Fencing or screening is shown only to highlight a particular point.

Literal interpretation of the areas shown should be avoided since symbols and areas are only diagrammatic.

Although off-street parking is shown for some of the segments reference should be made to Part III — 'Access and Parking' and Part II — 'Development Standards' for discussion of the suggested guidelines for residents' and visitors' parking in mobile home projects. The size of the area should relate to local requirements and conditions.

The alignment of walkways to homes, also diagrammatic, depends upon design factors such as the use of platforms or porches at entrances and grading.

### SEGMENT 1

Most projects will have some portions of the road system with a straight alignment. Obviously grid or semi-grid street patterns contain straight portions as do curvilinear layouts and the 'legs' of culs-de-sac and looped streets.

In the first segment a mix of mobile home types are shown on both sides of a straight portion of street.

The use of different types and models of homes and setbacks eliminates the possibility of a regimented appearance

*The staggered setbacks provide an interesting pattern; the pedestrian's line of sight is diverted by the changes in the setbacks.*

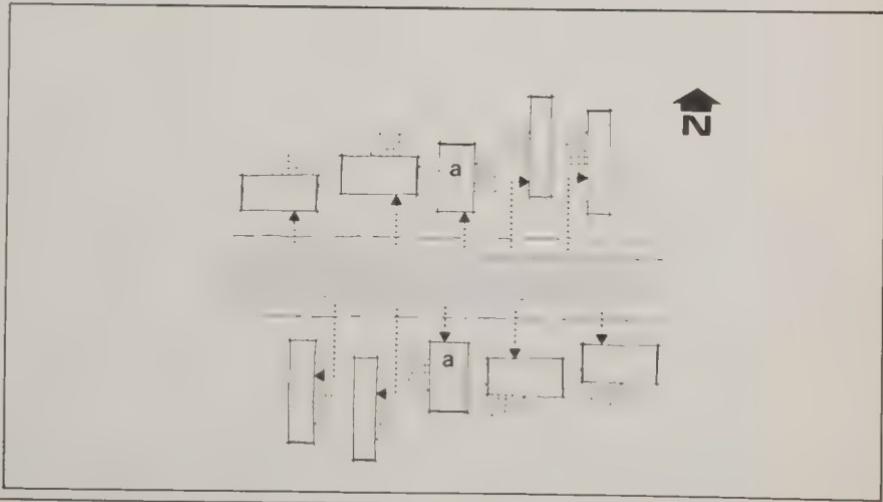
*Mobile home model a provides a balance between the abrupt difference in shape and orientation of the homes on either side*

*The homes are sited so that efficient use of the land is made for both mobile homes types and models used*

*The street runs in an east-west direction; most private yard areas will receive adequate sunlight; not all daytime areas can be oriented to the south*

*Some parking areas and storage facilities can be shared.*

*Screening should be used in those instances where large windows, entrances or patios need protection for the sake of privacy*



\*In this Part walls without windows are indicated by a heavy, solid line

## SEGMENT 2

This segment illustrates a variation of a court in which homes are sited around a common area. It is also included to emphasize the importance of the streetscape.

Geometric patterns such as this can be effective if the placement and appearance of the mobile homes is carefully considered.

This segment contains all single-wide homes, some of which have additions at the front entrances.

*All the main doors are identifiable from the street while private yard areas are within the interior*

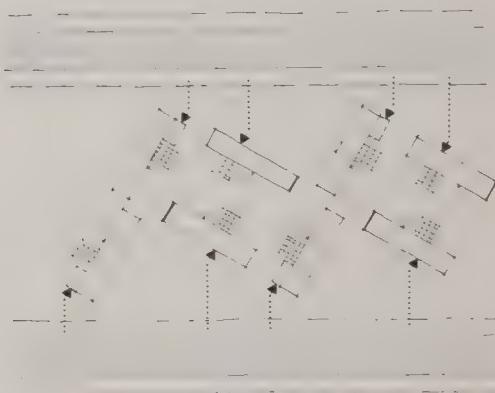
*The majority of private yard areas/patios can receive direct sunlight if the street is oriented in a north-south direction.*

*An interesting streetscape results from the abrupt changes in orientation of the homes.*

*The models of homes should be carefully selected so that similar homes occupy the same position in the pattern.*

*To visually enhance the streetscape the models in the segment should be of compatible colours and similar in detail*

*To achieve the full impact of the segment's appearance and to prevent a haphazard look the conformation of setbacks, angles, and alignment of sides of the homes has to be carefully followed*



**SEGMENT 3**

Linear open space flows along the interior of the block in this segment. This strip can be a focal point for some of the homes and the location of services.

*All homes benefit from the visual quality of space, in particular those homes not fronting directly on the street.*

*Water, sewer and power lines can be located within the open space (access for maintenance must be guaranteed).*

*Lot surface drainage can be carried to the open area*

*Landscaping the open area will add to the segment's appearance*

*Walkways, recreational areas, storage structures, cycle paths, etc., can be located within the open space.*

**SEGMENT 4**

The central portion of a P-loop contains eight mobile homes; the four central ones form a quadrangle.

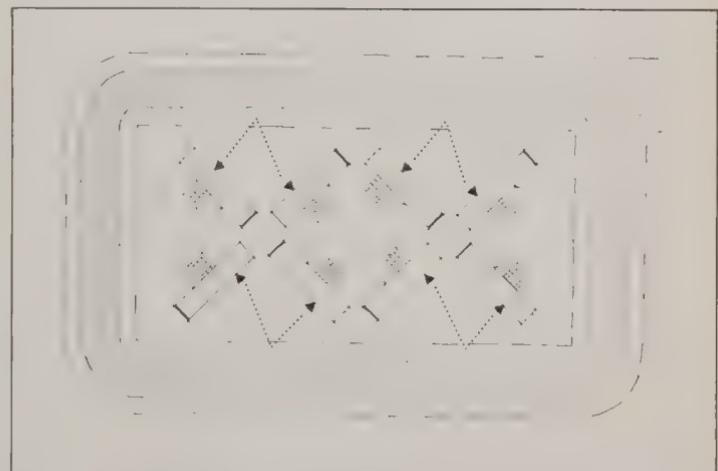
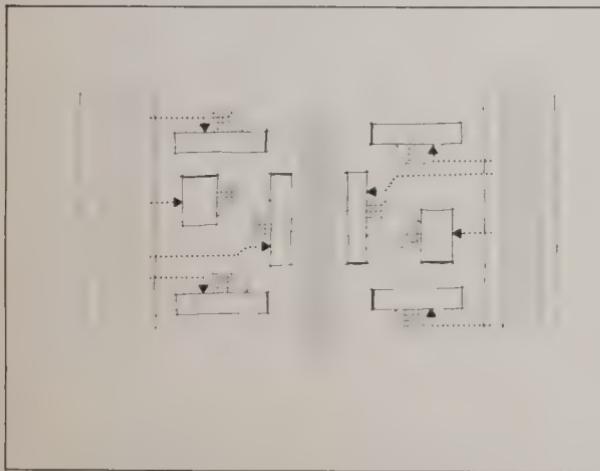
*Some mobile homes are 'reversed' so that sleeping portions of the homes are nearest the street.*

*Some private yard areas are shielded from the street by screening or the mobile home itself; screening should shield private yards in the interior and on the short sides of the loop.*

*The interior of the quadrangle could be used for informal activities, such as a child's play area, gardening; a storage facility could be shared.*

*Similar homes should be used which form a related composition conveying a feeling of order and a pleasant appearance*

*Walkways to the street and parking areas could be shared.*



## SEGMENT 5

Curved portions of streets probably appear in most housing projects and may be predominant in some street networks

Many siting patterns can be adapted to different street segments — but the focus may be different

In this segment which is a more-or-less straight portion along a reverse curve, an adaptation of a familiar diagonal pattern is used. There will be a difference in the visual impact however. Travel along a curve produces a constant change of image

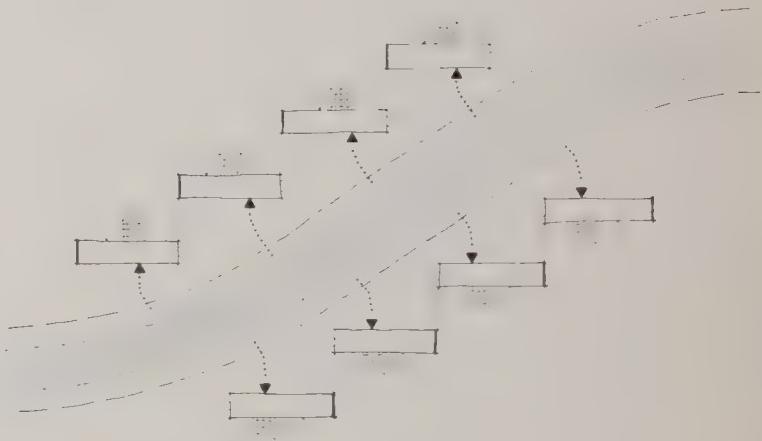
This segment can be a transitional element between sitings along areas with greater curvature

*Single-wide mobile homes are sited on both sides of the street so their main doors face the street*

*In this stepped arrangement along a curve single-wide mobile homes appear to be parallel to the street*

*Screening shields the rear yards of the homes and unifies the siting*

*The appearance of the stepped homes is enriched when they are similar in their exterior character*



## SEGMENT 6

In this segment double-wide mobile homes are clustered around a central area which links the main entrances of the homes to the street and a common parking area.

Another cluster is nearby. Such clusters are located along a curved stretch of road, but might be adapted to other sites.

Segments of this kind are most appropriate in projects where common areas can be adequately maintained.

*The central area is formal in character and non-private; it could be designed with gardens, conversation centres (with benches or children's play area)*

*All private yard areas are located away from the central court so the homes act as a shield in most cases, screening from other homes or parkland should be used as required*

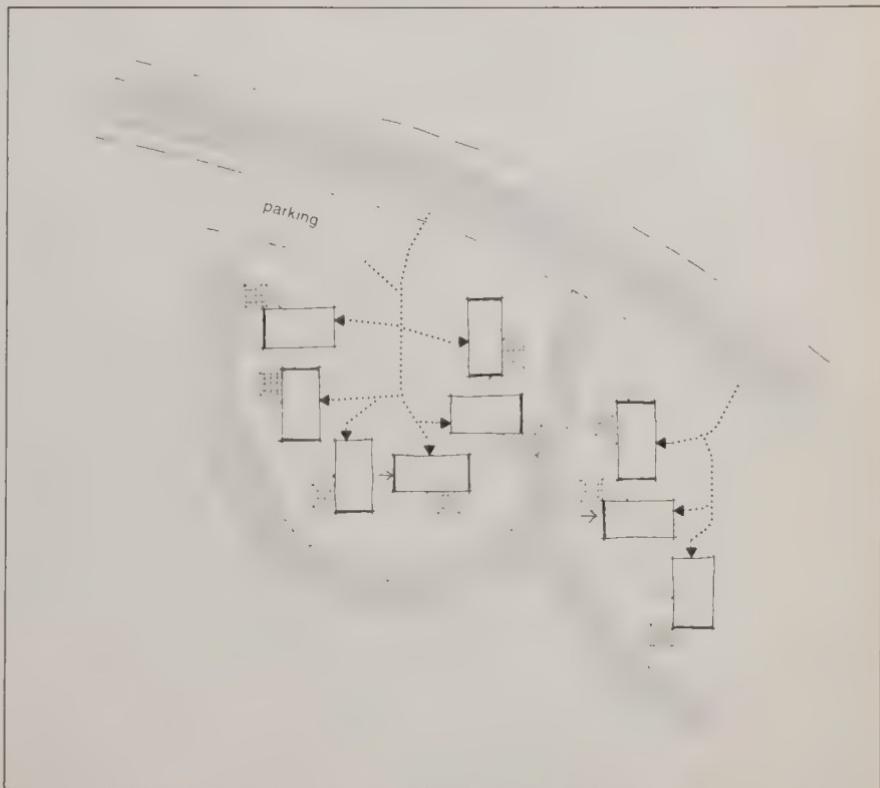
*Storage and utility areas can be located away from the centre*

*Although all homes have large windows and main doors facing the common area they are either not facing each other or separated by sufficient distance*

*A band of open space runs between the clusters connecting the street and open space in the interior*

*There are trade-offs for households longer distances to parking, sidewalk and street vs. proximity to project open space and favourable locations for private yard areas*

*Such clusters can be effectively used in conjunction with more regimented segments*



## SEGMENT 7

Culs-de-sac offer relative privacy and freedom from traffic in comparison with 'through' streets. Since snow clearance is a concern in much of the province, the design of the culs-de-sac and arrangement of homes and parking areas should allow for clearance and storage of snow as required.

Unobstructed turning areas are necessary for emergency vehicles.

In this segment double-wide homes are sited around an off-set cul-de-sac in a seemingly random manner but one which is carefully planned.

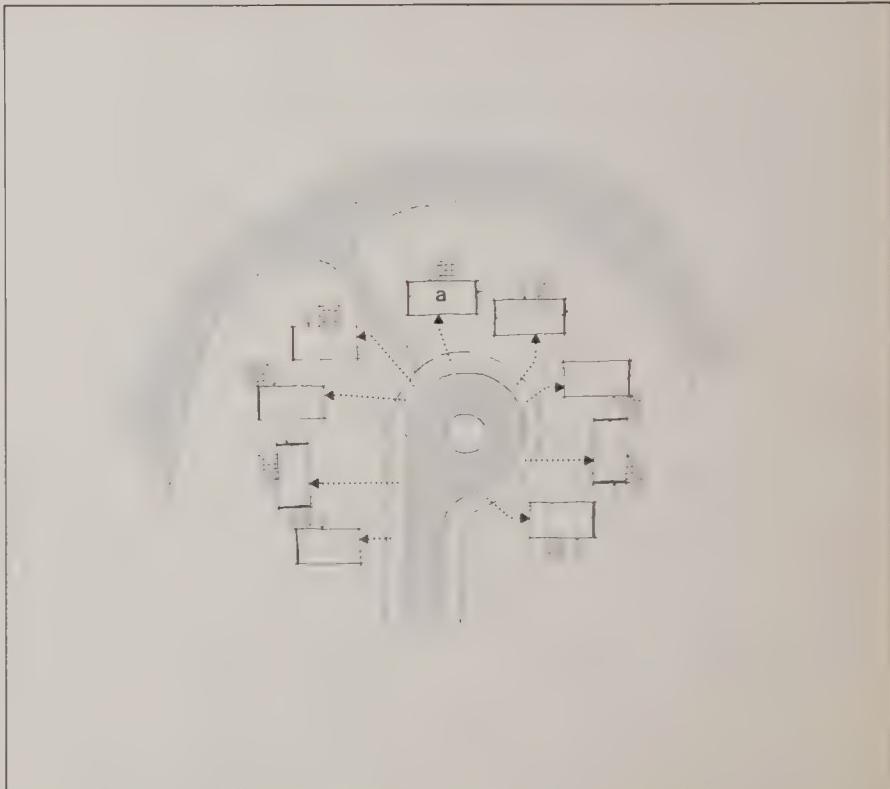
*The centre of the cul-de-sac can be landscaped, gardens are a possibility, and in winter snow can be stored there*

*Alternatively in areas where a large snowfall is normal home a at the head of the cul-de-sac could be eliminated and the area used for snow storage.*

*There is a link with the project open space system*

*Homes at the head of the cul-de-sac have direct access to open space*

*Homes convey a feeling of spaciousness because of the different orientations*



**SEGMENT 8**

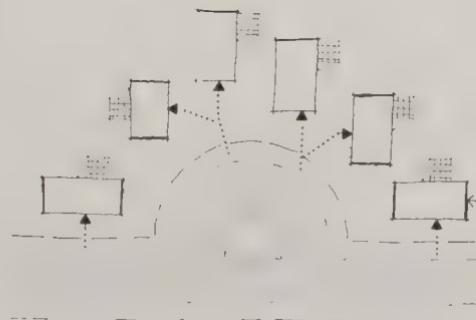
In this segment double-wide homes are situated around a short cul-de-sac.

Such segments could be situated throughout many projects either as a widely used feature or in conjunction with more traditional street patterns.

*The homes and private yard areas can enjoy the benefits of nearby open space and privacy of the cul-de-sac.*

*The central area can be landscaped to add to the segment's attractiveness.*

*Some walkways can be shared.*



## SEGMENT 9

Courtgardens can be ideally adapted to the climate of Ontario. Fences or walls which completely enclose the garden or yard provide protection from cold winds and blowing snow and can extend the use of the outdoors. Groups of courtgarden homes should be designed so that the outdoor yard receives the maximum sunlight possible in spring, fall and winter months.

Courts should be private and secluded with yard enclosures above eye level.

Courtgardens differ from some other segments because the house is not set back from a lot line.

The models must be carefully selected. The location of windows is critical in the design. Windows of other homes which do overlook a court should be screened to preserve the secluded character of the neighbouring yard.

In this segment models have been selected with different secondary entrance locations to illustrate how courts could be used with both types.

*These courtgardens can be located on the perimeter of the project, near ravines, parkland, etc., on flat or sloping sites.*

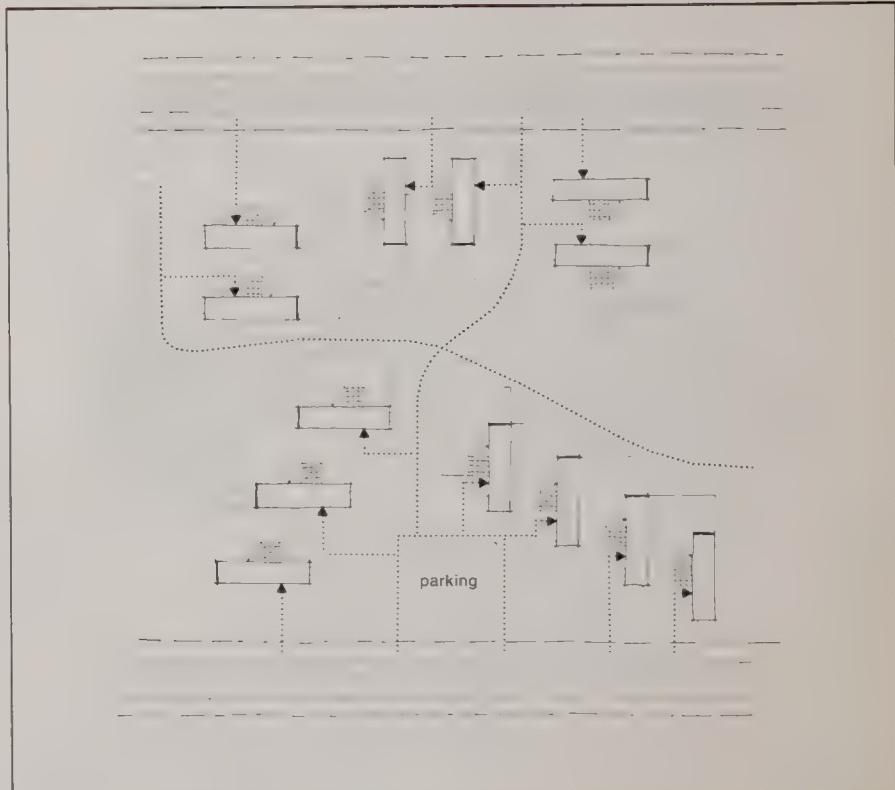
*Large windows overlook the home's courtyard or are oriented away from a neighbouring courtyard.*

*Smaller windows facing another court are screened to receive light but so that a neighbour's court is private.*

*Similar units and fencing should be used to enhance the appearance.*

*An internal walkway system and informal meeting areas can be incorporated in the open space.*

*Utility lines can be designed to follow the open space system.*





**EXAMPLES OF  
PROJECT DESIGNS**

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## EXAMPLES OF PROJECT DESIGNS

108

Herein six project designs illustrate the numerous guidelines for site planning that have been suggested at different levels — the lot, the group, the segment and the total project — in terms of general planning and design. The designs show that the consequences of applying the *Guidelines* are not substantially different from those which normally apply for other types of small, single-family dwellings.

*The project designs are presented for demonstration purposes only. They should not be used indiscriminately. The intent of the designs in terms of the Guidelines is the critical issue*

### A. Design Approach

To be most meaningful in demonstrating application of the *Guidelines*, the projects are designed to cover a wide range of topics and to offer different solutions for individual mobile home sitings, street patterns, treatment of open space and perimeter conditions

#### Concept/Orientation

One of the major differences in the general concept of the projects centres on land ownership. The total project designs include both parks and subdivisions.

Most often there are a few clear distinctions reflected in the design of the total project. Usually a park will have

- an administration centre
- an open storage area
- a central mail delivery point
- recreational facilities within the park's boundaries which will not be found in a subdivision

Small commercial facilities are also found in some parks

As well the park's road circulation system is usually treated differently. Integration with local streets is controlled through the use of few access points

The streets within the park project tend to converge on an activity centre such as an administration or recreation building

A subdivision's streets are generally integrated with other local streets

Easements for utilities would be characteristic of subdivisions. They would not be necessary in parks with privately owned utilities

These are generalities however. To illustrate possible variations which developers and municipal officials may find more mutually satisfactory some project designs point to alternatives. These include

- a park with an integrated street system
- a park which shares recreational land beyond the project's boundaries

In addition to differences in land ownership project designs are oriented towards specialized or generalized housing. Projects designed to attract a particular population segment as recreation communities obviously require that larger sums of land be devoted to recreational facilities, golf courses and tennis courts for example

At this scale of site planning the differences relevant to retirement or resource — oriented projects are not evident. It should be noted however, that several current retirement projects in Ontario are also recreation-oriented. Projects which are resource-related would resemble general housing projects

### **Locational Context**

The project designs reflect the wide range in character of Ontario's urban areas. To be as realistic as possible they are in a series of settings — from being surrounded by development to being on the urban fringe.

Each project design is set in the context of a specific location with an established road pattern, adjacent land uses and facilities but the designs are theoretical. In reality a host of other factors might be present because the physical character of the site and surrounding land uses are critical.

### **Size**

Housing needs vary throughout the province and the project designs reflect this fact. The sites vary in size from 2.7 to 17 hectares (6.7 - 42 acres).

Size must relate to location, scale, facilities and services.

### **Choice of Mobile Home Type**

The project designs vary to reflect general marketing patterns and preferences. At present most mobile home projects in Ontario have a mix of mobile home types, some with additions. The majority of projects show mixtures of types.

Some projects have only double-wide mobile homes. At this time there are only a small number of projects of this type in Ontario. However, in many older mobile home projects double-wides are replacing single-wides so there may be a trend to this type of project. This interest is also reflected in the recent percentage increase in double-wide mobile home sales.

### **Density**

Ranges in density have been attempted in the designs by working within the performance standards and setbacks presented throughout the *Guidelines*. These will of course be influenced by local development standards and land costs, and by facilities in the projects.

In addition, density would be influenced by different sizes and ratios of mobile home types, lot dimensions, block depths, street standards and so on.

In reviewing the projects it should be obvious that the chief factor in their design was not to achieve the maximum possible density. From the discussion of lot sizes and shapes in Part III it is clear that higher densities may be reached depending on the circumstances.

The design process did highlight the point that net densities greater than 25 units per hectare (10 units per acre) are only appropriate in small projects. To reach such a density in a mobile home project which contains only detached structures, other design factors, such as appearance or amount of outdoor activity areas, may be compromised.

### **Development Standards**

To have some continuity between the designs they were developed with similarities. For example, they all follow quite rigidly the minimum sideyard distances suggested earlier in the *Guidelines*.

Further, all projects have a street right-of-way whether they are subdivisions or parks. In general the standards are consistent with those suggested by the Ministry of Housing.\*

Street setbacks are based on the same recommended standards. In most instances the living room in the mobile home is near the street. Therefore the street lot line setback is 4.5 m (15 ft.) where there is no sidewalk and 6.0 m (20 ft.) where a sidewalk is provided.\*\*

Two parking spaces are provided for each mobile home lot. Some additional parking is provided in bays for visitors and service vehicles.

It is assumed all the projects are serviced with storm and sanitary sewage systems, water supply, electricity, telephone and other utilities to municipal standards.

\*Programs Section, *Urban Development Standards*, pp. 21-29.

\*\*ibid., pp. 32-35

## B. Project Designs

### Project 1

110

This 17.0 hectare (42.0 acre) mobile home park is part of a larger neighbourhood in a large urban centre. It has a minor collector street running through the site which links with a main collector street, and then in turn to an arterial street system. Cul-de-sac and P-loops extend from the minor collector.

The minor collector is designed as a public street with all other streets private. The minor collector could also be private.

A divided entrance to the minor collector helps to emphasize the project's identity and ease the flow of traffic. The park's administration centre is located on the minor collector.

The community centre serves the residents of the park and other homes nearby. It is located on the periphery of the site and is part of the neighbourhood park system. Playground areas and small storage areas are integrated with the walkway and park system. A central storage area, which is fenced and landscaped, is adjacent to the administration centre where it will be under surveillance.

The park is linked to the neighbourhood's parkland by a central open-space walkway network. Direct access to this network is possible from many houses while other residents have only a short walk to it.

Trees act as a buffer along the arterial roads abutting the site.

The siting of the individual homes recognizes the setbacks and separations as well as many other guidelines discussed earlier. A variety of arrangements is included to demonstrate the effects of different approaches to urban design for mobile homes.

The project design consists of the following mobile home types in the following ratios:

Type	Units	Percent
Single-wide	175	73
Single-wide with addition	26	11
Double-wide	39	16
Total	240	100%

Pertinent density figures are as follows:

Description	Area Size	% Total Area	Density
Gross (total site)	17.0 ha (42.0 ac)	100%	14.1 u/ha (5.7 u/ac)
Net (total site excluding streets)	13.6 (33.5)	80	17.6 (7.2)
Net (total site excluding streets, open space, admin areas)	11.9 (29.5)	70	20.2 (8.1)

ha = hectare

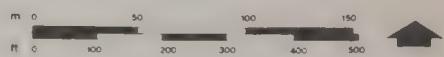
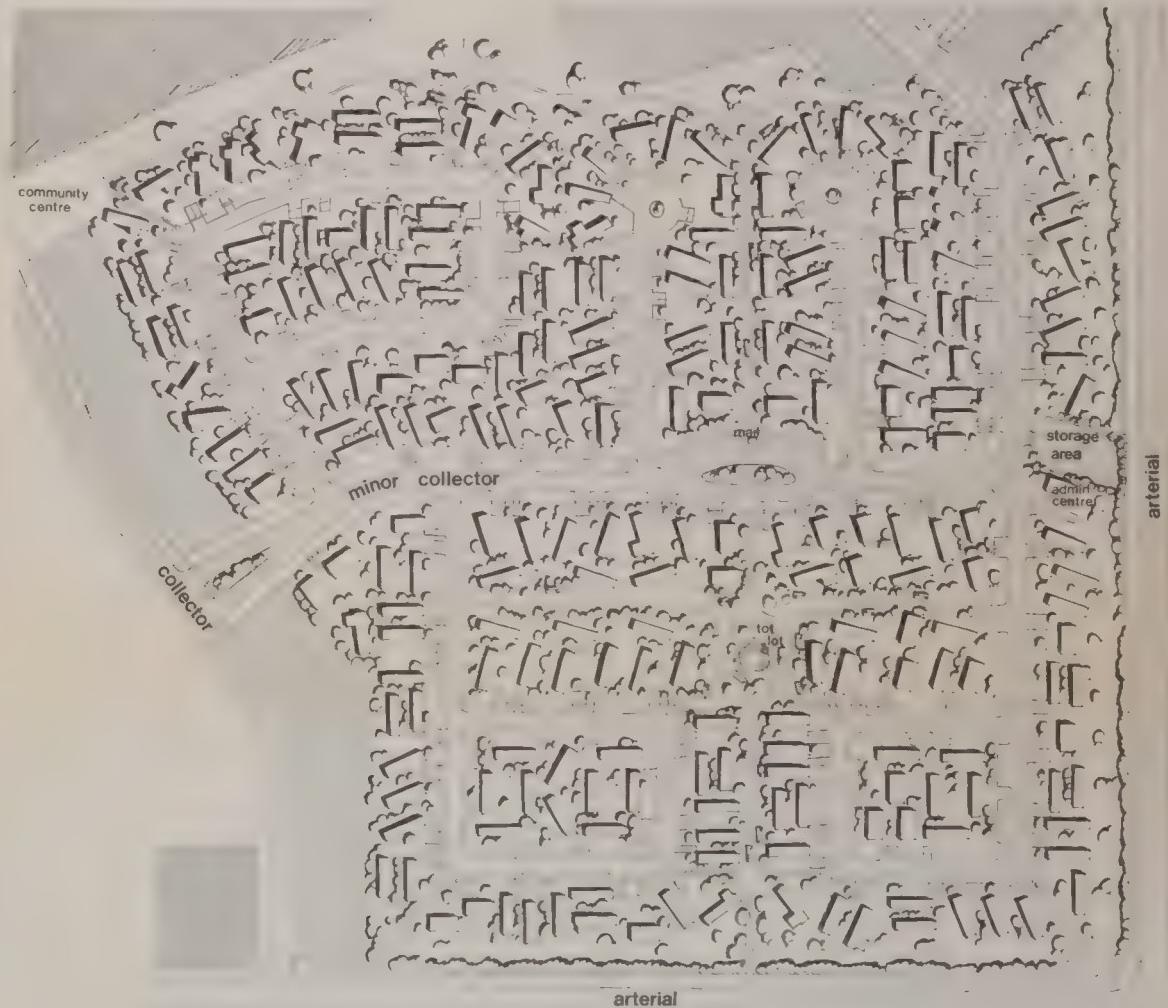
ac = acres

u/ha = units/hectare

u/ac = units/acre

KEY PLAN





## Project 2

The second project design falls within the same urban context as that of Project 1.

This 4.8 ha (11.9 ac) mobile home subdivision is located between conventional housing areas and abuts the arterial road on the edge of the neighbourhood. It is also bounded by main neighbourhood collector roads on the east and south. neighbourhood schools and a community park are to the east.

Much of the site is developed along two culs-de-sac which share a central open-space walkway system. A tot-lot/play area is the focal point of the site's open-space system.

Homes on the west edge of the site are set back from the arterial road and screened by berms, trees and fencing.

The design includes the following mobile home types:

Type	Units	Percent
Single-wide	36	50
Single-wide with addition	14	20
Double-wide	22	30
Total	72	100%

Relevant densities are

Description	Area Size	% Total Area	Density
Gross (total site)	4.8 ha (11.9 ac)	100%	15.0 u/ha (6.0 u/ac)
Net (total site excluding streets)	3.9 (9.7)	81	18.5 (7.4)
Net (total site excluding streets open space admin areas)	3.5 (8.6)	73	20.6 (8.4)

KEY PLAN





## Project 3

114

Project 3 is a 2.7 ha (6.7 ac) mobile home park located in a small urban centre. The project is integrated with adjacent residential areas, parkland and school facilities.

It has been designed to a reasonably high density to reflect high land costs in that particular location and to demonstrate the flexibility of the recommendations in these *Guidelines*. The choice of a relatively small site and a limited number of units minimizes the loss of amenities.

One private street loops through the project. A central walkway flows through the mid-block. Another walkway connects the park with the school and parkland — a third with the residential area to the west.

The administration centre is visible from one entrance to the project. It may be occupied by the park manager and act as the locus for mail delivery and visitor parking. Alternatively in a small project the administration centre may not be necessary, in which case the lot could be used for another mobile home.

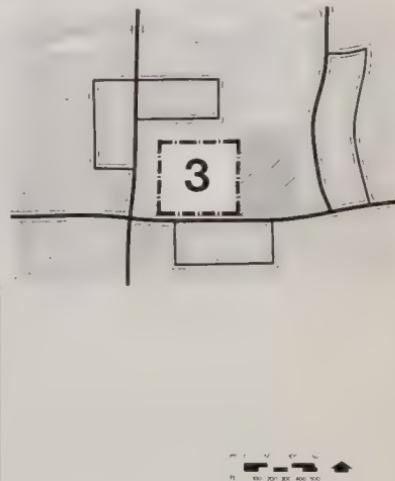
The project design includes the following mobile home types:

Type	Units	Percent
Single-wide	10	20
Single-wide with addition	5	10
Double-wide	34	70
Total	49	100%

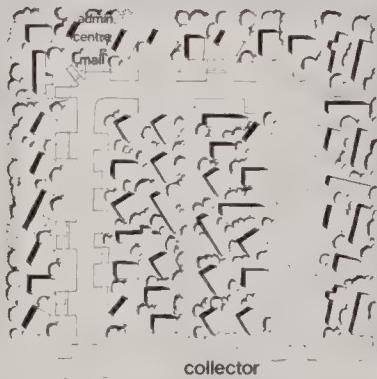
The unit densities are

Description	Area Size	% Total Area	Density
Gross (total site)	2.7 ha (6.7 ac)	100%	18.2 u/ha (7.3 u/ac)
Net (total site excluding streets)	2.1 (5.3)	78	23.3 (9.2)
Net (total site excluding streets, open space, admin areas)	1.9 (4.8)	70	25.8 (10.2)

### KEY PLAN



collector



collector

local



## Project 4

Project 4 is a 13.7 ha (33.9 ac) mobile home park containing only double-wide units. It is situated in a small town. It is designed to be recreation-oriented, taking advantage of the adjoining lake and golf course. The site also abuts existing housing and a school-park site.

A minor collector street runs through the site connecting with the area's collector road network. The minor collector is designed as a public street with all other streets private. It could be private also. A series of P-loops and culs-de-sac running off the minor collector form the internal road system.

The administration centre is located at the main entrance of the park. A storage area which could be used for boats, trailers, etc., is also located at the entrance to the park. Adjoining the beach and lake areas is a clubhouse for the project's residents. It is near the community's recreation centre.

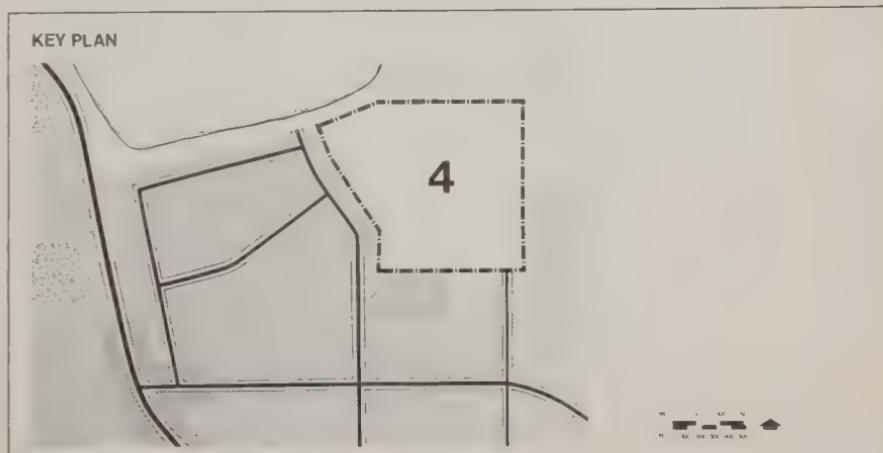
The project is linked to the lake and golf course by the open-space walkway network. This park system includes playgrounds and closed storage areas. A mail delivery station is at a central junction of the walkway and minor collector street.

The project design consists of the following mobile home unit mix:

Type	Units	Percent
Double-wide	189	95
Double-wide with addition	10	5
Total	199	100%

The unit densities are:

Description	Area Size	% Total Area	Density
Gross (total site)	13.7 ha (33.9 ac)	100%	14.5 u/ha (5.9 u/ac)
Net (total site excluding streets)	10.0 (24.8)	73	19.9 (8.0)
Net (total site excluding streets, open space, admin areas)	8.7 (21.6)	64	22.9 (9.2)





## Project 5

118

This project design is a 4.2 ha (10.4 ac) mobile home park. Its setting is in a small urban centre. The project is designed to be in scale with the small community and to take advantage of the adjoining conservation area. The design is based on entirely double-wide units.

The street layout is private and consists of a looped street off which are two short culs-de-sac. Open-space and a walkway network flow through the project to the park and conservation area. The system includes a centrally located play area. There is also a walkway to the adjoining school-site. Closed storage areas are located on the central walkway within the park system.

The administration centre is located at the entrance to the project. Mail delivery and service vehicle parking are nearby. There is visitor parking on the local collector street.

The project design consists of the following:

Type	Units	Percent
Double-wide	56	95
Double-wide with addition	3	5
Total	59	100%

### Densities of the project are

Description	Area Size	% Total Area	Density
Gross (total site)	4.2 ha (10.4 ac)	100%	14.0 u/ha (5.6 u/ac)
Net (total site excluding streets)	3.2 (8.0)	77	18.4 (7.4)
Net (total site excluding streets open space, admin areas)	2.8 (6.8)	65	21.1 (8.7)

### KEY PLAN



collector



collector

local

conservation area



## Project 6

120

The final project is a 10.8 hectare (26.8 ac) mobile home park located in a medium sized urban centre. Basic to the design is the separation of homes for families with children from those accommodating only adults. The families-with-children section is to the east nearest the school. However the project's focus is a central recreation area and administration centre. Other housing, a golf course, a conservation area and school adjoin the site.

The road system consists of a minor collector with separate entrances serving the adult and family sections. Local streets consist of crescents and a cul-de-sac.

A walkway system links the central park and adjoining uses. Closed storage areas are located in the park and walkway system.

Recreation facilities include tennis courts, an ice pad, pool, play area, lawn bowling green and passive open-space.

Mail delivery and service vehicle parking are near the administration centre.

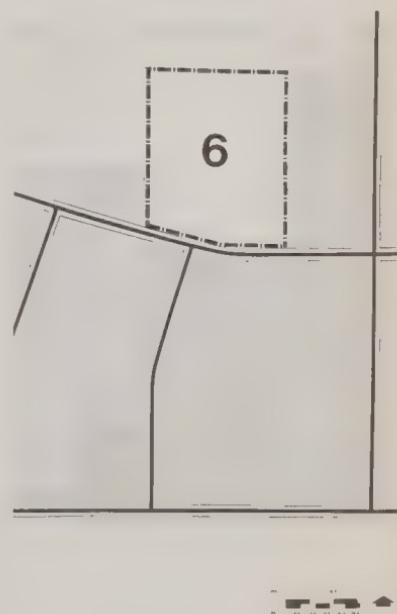
The project design consists of the following mobile home unit mix:

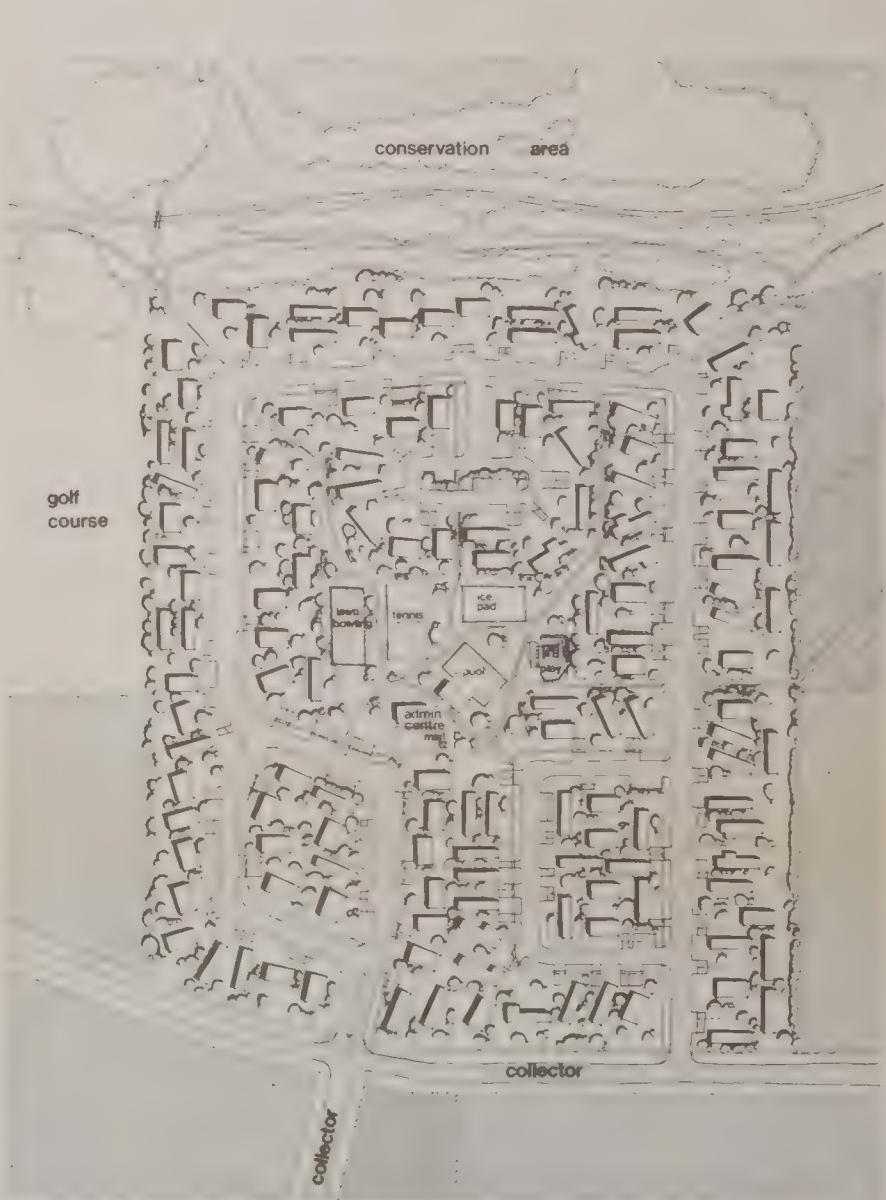
Type	Units	Percent
Single-wide	59	42
Single-wide with addition	14	10
Double-wide	66	48
Total	139	100%

The unit densities are

Description	Area Size	% Total Area	Density
Gross (total site)	11.8 ha (26.8 ac)	100%	12.3 u/ha (5.2 u/ac)
Net (total site excluding streets)	8.3 (20.4)	77	16.8 (6.8)
Net (total site excluding streets, open space, admin areas)	7.1 (17.5)	66	19.6 (7.9)

### KEY PLAN







## ONTARIO MINISTRIES CONCERNED WITH MOBILE HOMES OR MOBILE HOME PROJECTS

MINISTRY	AREA OF RESPONSIBILITY
ATTORNEY GENERAL	<ul style="list-style-type: none"><li>• tenant rights</li></ul>
CONSUMER AND COMMERCIAL RELATIONS	<ul style="list-style-type: none"><li>• warranties</li><li>• Ontario Building Code</li><li>• rent review</li></ul>
ENVIRONMENT	<ul style="list-style-type: none"><li>• noise control</li><li>• water supply system</li><li>• sewage disposal system</li></ul>
HOUSING	<ul style="list-style-type: none"><li>• official plan policies</li><li>• zoning by-law provisions</li><li>• subdivisions</li><li>• guidelines for mobile home projects</li><li>• rehabilitation loans</li></ul>
NATURAL RESOURCES	<ul style="list-style-type: none"><li>• responsible for general development in unorganized areas</li></ul>
REVENUE	<ul style="list-style-type: none"><li>• assessment</li><li>• land speculation tax</li><li>• retail sales tax</li></ul>
SOLICITOR GENERAL	<ul style="list-style-type: none"><li>• police escorts for oversize mobile homes on highways</li></ul>
TRANSPORTATION AND COMMUNICATIONS	<ul style="list-style-type: none"><li>• movement of mobile homes on highways</li></ul>



## SHIPMENTS OF DOMESTIC MOBILE HOMES TO ONTARIO

Year	Singles		Double Wide		Total
	No.	%	No.	%	
1971	1,435	85.3	247	14.7	1,682
1972	1,652	76.6	505	23.4	2,157
1973	2,001	77.2	591	22.8	2,592
1974	2,313	60.8	1,491	39.2	3,804
1975	1,746	66.4	884	33.6	2,630
1976	1,361	59.7	920	40.3	2,281
1977 (6 mos)	514	62.1	314	37.9	828

Source Statistics Canada  
 Catalogue 41-009  
 SERVICE BULLETIN  
 Fabricated Metal Products  
 Vol. 6, No. 33  
 August 1977.



## **NOISE AND THE MOBILE HOME**

Prepared For

Local Planning Policy Branch  
Ontario Ministry of Housing

By

Valcoustics Canada Ltd.  
Consulting Engineers  
Toronto, Ontario

October 14th, 1977

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## 1. Introduction

*"Great Science nobly laboured  
To increase the people's joys,  
But every new invention  
Seemed to add another noise"*

This jingle by Sir Alan Herbert in 1938 is as applicable today as it was then. It applied in nearly every aspect of life either in the home or outside.

This situation coupled with the tendency of people to consider noise as all sounds except those they themselves make, generates many annoyances, some justified, some not.

## 2. Summary

To obtain specific information on the sound isolation performance of current mobile home construction, a sample of an exterior wall, with and without a window was laboratory tested to determine the acoustical transmission loss. Field measurements of noise reduction for several typical installations were also carried out.

The data indicates that the sound isolation performance of recently constructed mobile homes is marginally less than for wood-frame construction with standard wood or metal siding exteriors (several decibels), and significantly less than for wood-frame construction with brick veneer exterior (up to 10 decibels). Nevertheless, the performance is sufficiently high to indicate that many problems regarding acoustical privacy are most probably not related to the fundamental construction of recent units, but to less than optimum siting.

It is the aspect ratio of outside dimensions, particularly in the case of single-wide units, and the attendant distribution of windows, as well as the interrelationship of outdoor areas to the windows of adjacent independent units, that are the major factors which determine the potential acoustical privacy level and which must be taken into account in the planning of mobile home developments to achieve the maximum potential sound isolation.

The measured data also indicates that the acoustical isolation performance of the older mobile homes tested was significantly poorer than those of current construction.

## 3. Sources and Sounds

Sound generated by transportation is probably the most pervasive sound of modern industrialized society. The passenger motor vehicle, the truck, the train, the aeroplane, create a continual din over much of rural and all of urban southern Ontario. Local neighbourhood sounds would include lawn mowers, snow blowers, dogs barking and children at play.

Within the home, rural or urban, hi-fi, T.V., vacuum cleaners, heating and cooling equipment, washers and dryers, all contribute to a relatively high sound exposure for the occupants.

However, in a rural area, the local sounds are much subdued. The lowing of cattle, the barking of dogs, the rattle of farm machinery are present, but they are separated from the listener by distances measured in rods rather than feet, thereby resulting in an attenuation and mellowing of the sound as it is transmitted across the intervening space.

When dwellings are crowded together as in the urban scene, these mitigating acoustical effects are not present. Sounds which are heard above the ever-present ambient are probably loud, harsh, and shrill, generated by processes or devices which serve the owner, but are worthless to all others within earshot. The latter are distracted, disturbed and annoyed by the resultant din.

In general, this is the acoustical situation in the residential community, whether it be the Annex district of Toronto, with solid brick and stone structures, or as in a development with mobile homes in close array.

## 4. People and Their Dwellings

No doubt, residents in each of the communities choose their abode because of advantages to be gained: proximity to work, transportation, pseudo-rural setting, or price, to name an obvious few.

What are the differences in the acoustical conditions? In the Annex, the ambient sound level will be relatively high throughout all periods of the day. Small neighbourhood sounds will be masked. Loud and persistent neighbourhood sounds will be accepted as indigenous to the area, or they will distract and annoy, depending on the expectations and personality of the citizen.

In the pseudo-rural setting, the same situation exists, except that there is little masking by high level ambient sound. Therefore, transient sounds which would be masked in an urban community, will be clearly apparent in the pseudo-rural counterpart. Also, there undoubtedly will be those who will choose the mobile home park and find to their chagrin that the anticipated tranquillity does not exist in close-coupled communities.

This situation applies particularly to out-doors. The distance between one side of a property boundary and the other is always zero. Thus, regardless of the size of the property, the condition persists, where the neighbour is just on the other side of the boundary. On the other hand, even if one retreats to the farthest accessible point of a thirty or forty foot lot, the attenuation of a distracting sound, due to distance, will represent only a minor change in loudness or potential to distract. This condition exists whether in a city or in a mobile home park.

## 5. Dwellings in a Noise Environment

Indoors there may be a difference between the typical urban and mobile home park situations, because of differences in construction materials and technique.

The exterior fabric of dwellings consists of roof, structural walls, windows and doors. The windows and doors of dwellings constructed conventionally, on site, or by prefabrication, are essentially identical, acoustically. However, the walls and roof are not necessarily so.

Masonry walls will normally provide greater acoustical isolation than will those of wood-frame construction. Both types are common in conventional on-site construction, but wood-frame construction only is found in prefabricated mobile home structures.

The usual on-site constructions, employing wood-frame structures, are potentially more effective as sound isolators than some prefabricated types, such as mobile homes, since their outer layer will be heavier, and their inner skin will be plaster or gypsum board, rather than particle board or plywood.

The typical peaked roof system constructed on-site provides a very large air space between the outer skin and the ceiling of the occupied area. In this space is a large quantity of thermal insulation, which also provides significant acoustical absorption, resulting in an overall system capable of relatively high sound isolation performance. The typical prefabricated mobile home roof/ceiling system must also have the thermal insulation which contributes to the acoustical performance, but the air space is significantly less in comparison. Therefore, the mobile home roof may be expected to be less effective as a barrier to external noise, compared to the "conventional" case. However, the mobile home roof system is still judged to have higher sound isolation than the associated wall construction.

In the case of the mobile home, there is one additional surface through which sound from outside may potentially enter into the inside — the floor. Commonly, mobile homes are installed on piers, or equivalent, several feet above grade, with a wood, metal, or plastic skirt to close off the space under the unit. (Some units are installed with full in-ground basements, and the normal foundation walls, but these are a small minority).

It is important to realize that when a window is open, the effect is acoustically the same whether the structure is masonry, frame, constructed on-site, or pre-fabricated. When windows are closed, the structure, particularly that of the wall and windows, becomes of significance.

## 6. Sound Isolation Performance of Conventional On-Site and of Mobile Home Construction

There did not seem to be data available on actual measurements of the sound isolation of structures such as those of mobile homes. Therefore, a number of measurements, both in the laboratory, and in the field, of the sound isolation performance of current mobile home construction were undertaken.

Two types of measurements were done:

1. Laboratory measurement of the acoustic transmission loss (TL) of a typical exterior wall, with and without a window
2. Field measurements of the noise reduction (NR) from inside to outside, for several typical mobile home installations

The sample mobile homes used were chosen to be representative of current construction with the assistance of technical representatives appointed by the executive of the Canadian Mobile Home Association (CMHA). The CMHA representatives also arranged for the construction of the test wall in the laboratory.

The acoustical transmission loss refers to the ratio of sound energy incident on a surface to that transmitted through it, expressed in decibels (dB). The transmission loss is a property of the surface in question.

The noise reduction is a simple measure of the difference in sound level between two attached spaces. For example, if an interior sound level of 45 dB results with an outside sound level of 65 dB, then the NR is 20 dB. The noise reduction in a real situation is not a function of any one component, but the composite effect of all of the sound transmission paths (i.e. doors, windows, walls, ceiling, ducts, openings, etc.), acting

together, as well as the amount of acoustical absorption present in the receiving space. The absorption of sound energy in the receiving space results in lower sound levels and thus the greater the absorption present, the greater the sound reduction, in any given case.

The laboratory tests were carried out by building a mobile home wall in the 8 ft by 9 ft opening between the two laboratory test chambers, and measuring the percentage of sound energy transmitted through the wall. The wall was then fitted with a window and the tests repeated.

These measurements were carried out under standardized conditions according to the procedures in ASTM specification E90-70 (American Society for Testing Materials). The full laboratory report is reproduced in Appendix I.

The field tests, of course, involve non-standardized conditions, but generally follow the same principles used in the laboratory tests. Three typical, recent, mobile home installations were tested, *in situ*, two "double-wides" at one site, one "single-wide" at another site. In each case, the room involved was an end bedroom. A sound source was placed outside and the difference in sound level across the wall was measured. For two units, the measurements were repeated with the outdoor sound incident on a blank wall and a wall with a window.

One of the double-wide units tested was installed over a full basement having concrete block walls. The other unit, although not identical, was similar in construction, but installed on piers, with a plywood skirt from floor level down to grade. The skirt would not provide a high degree of sound isolation. Therefore, comparison of the test results for these two units may be used to de-

termine the significance of the floor as a sound transmission path.

Full details of the field tests may be found in Appendix II.

The results present either the TL or NR, as appropriate, in each 1/3 octave frequency band, as well as a single number rating derived from the more complex frequency data. Table I gives a summary of the results in terms of the single number ratings.

TABLE I  
MOBILE HOME ACOUSTICAL TESTS

Condition	Laboratory STC Rating
Blank Wall	33
Window Wall	31
Condition	Field NIC Rating
Sample 1, Blank Wall	36
Sample 1, Window Wall	35
Sample 1, Window Wall (window open 6")	25
Sample 2, Blank Wall	35
Sample 3, Blank Wall	37
Sample 3, Window Wall	35

Sample 1: Doublewide, full basement, Angers, Quebec site

Sample 2: Doublewide, on piers, Angers, Quebec site

Sample 3: Single wide, on piers, Hoe Doe Valley (Barrie), Ontario site

The single number ratings are computed according to the procedure of ASTM E 413-70T and result in the Sound Transmission Class (STC) rating for TL data and

Noise Isolation Class (NIC) rating for NR data. These simple ratings facilitate comparisons between different units, but do represent vast simplifications. In situations where the noise of concern is broadband in nature, the STC and NIC ratings are useful in indicating the degree of sound isolation performance. This would be the case for traffic noise or speech. Where the sounds may have unusual spectral characteristics or pure tones, the single number ratings alone may not be appropriate in assessing the acoustical performance. An example of this case would be modern rock music played on a hi-fi with the bass turned up.

The field test results indicate that the floor system is not a major component with respect to propagation of sound into or out of the mobile home.

Although the available acoustical performance data does not directly permit assessing the sound isolation of the roof/ceiling system, it is estimated to be, on the average, superior to the exterior wall, based on typical construction details (7/16" fibre board ceiling tile, 7/16" sheathing, shingles, vented soffit). Therefore, the exterior walls (and attendant openings) are the single-most important sound isolation component.

For comparison with the mobile home data, a conventional wood-frame, brick veneer structure (1/2" gypsum board interior, vapour barrier, 2" x 4" studs, 2" (or thicker) mineral wool or glass fibre batts, sheathing, 1" air space, 4" brick veneer), has an STC rating of 46\*; a conventional wood-frame structure with siding (1/2" gypsum board interior, vapour barrier, 2" x 4" studs, 2" (or thicker) mineral wool or glass fibre batts, sheath-

ing, fibre backer board, wood or metal siding) has an STC rating of 36\*.

If a window is introduced into the exterior wall, it will modify the STC of the wall plus window. Consider a double glazed window with sliding sections of 32 oz. glass, effectively gasketed at the edge, and separated by a space of 2 inches, and with an STC rating of 32\* when closed. If the window occupies 10% of the area of the wall, the new STC values for the wall plus window may be computed and the following values of STC obtained:

	STC
conventional wood-frame, brick veneer	+ window 41
conventional wood-frame, siding	+ window 35
prefabricated mobile home	+ window 31

The mobile home wall/window system potentially provides significantly less sound isolation than a wood-frame, brick veneer wall/window and marginally less than the case with exterior siding finish, the window closed in all cases.

For comparison purposes, it is interesting to note that the Ontario Building Code requires demising partitions in multiple family buildings to have an STC rating of 45. It is generally considered by acousticians that partitions should have STC ratings of at least 50-55, for good acoustical privacy, under modern conditions. It is thus readily apparent that, even "conventional" housing, which because of construction and separation has excellent acoustical inter-unit isolation, may under certain conditions have marginal sound isolation from outdoors to indoors, even with closed windows.

A sampling of older mobile home units was also field tested in the same manner as discussed earlier; in order to provide a comparison to the more current

forms of mobile home construction. The evolving changes, over the years, in the construction details, suggested that the acoustical isolation performance should be progressively better for newer units. Three sample mobile homes of 1960, 1968, and 1972 vintage were selected with the assistance of the CMHA representatives. The test results, detailed in Appendix III, did indeed indicate significantly poorer acoustical isolation, compared to the "current vintage" (1976) models.

## 7. Noise Abatement Techniques

Assume one wishes to compensate for the difference in transmission loss of the structure of a mobile home relative to that of conventional on-site wood-frame construction. This could be done by adjusting the distance between the source (open window of a neighbouring unit, or barbecue party), and the mobile home — with windows closed. The distance, in the case of the mobile home, considering the conditions assumed and the values of STC derived in the previous section, would have to be about 3 times (-10 dB) that for a brick veneer house, or about 1.6 times (-4 dB) that for the exterior siding case\*\*.

If one considers the case of a mobile home with an open window and line of sight to the source as unacceptable, the condition can be rectified by increasing the distance — source to open window. Since the attenuation through an open window is at best about 15 dB, the distance would have to be increased by a

\*Central Mortgage and Housing Corporation (CMHC) Draft Publication 1976 — *New Housing and Road and Rail Noise*, and private communication from Dr T D Northwood, Head, Noise and Vibration Section, National Research Council.

\*\*In free space, the level of a sound is reduced 6 dB for each doubling of distance.

factor of 6.3 ( $-16$  dB) to recover the condition with closed window\*.

However, it must be emphasized that in the case of an open window, the mobile home does not differ fundamentally from any other structure. The open window will dictate the amount of noise reduction and the details of the rest of the structure are essentially immaterial under these conditions.

An alternative to increasing the distance, is to erect a sound barrier between the source and the listener. The source may be an open window, or activity outside on a patio, and the listener might be considered an open window next door.

Under these conditions, the barrier may be a fence, or a portion of the structure of one of the homes. It must be essentially airtight and have a mass of not less than 2 pounds per square foot of face area\*\*. In order to provide acoustical screening, the barrier must be dimensioned to interrupt the line of sight between the source and listener. The further the barrier protrudes beyond the line of sight, the more effective the acoustical screening, all other factors being held constant.

The amount of sound attenuation provided by a barrier of a given height is dependent on the relative distances of the source and the listener to the barrier. The closer that either is to the barrier, the deeper they would be in the "shadow" zone and the more effective the barrier would be.

Of course, the lateral extent of a barrier must be sufficient so that the amount of sound arriving at the re-

ceiving point by the path around the ends is negligible. In cases where the barrier can be terminated at existing structures, this flanking path can be adequately closed off. The effective extent of a barrier can be increased to deal with the matter of end flanking by extending a portion at right angles from the end. These concepts are illustrated in Figure 1.

In the situation where the corner of a building is used as a sound barrier, the vertical height of the structure must be sufficient that the sound attenuation for the path over the top is at least as substantial as that around the corner.

In order to utilize a sound barrier between adjacent installations, to compensate for the loss of acoustical isolation resulting when a window is open, 16 decibels of attenuation is required (see above), assuming the source-listener distance is unchanged. (This amount of attenuation is at the limit of what is generally considered a maximum attenuation achievable by a barrier, in practice).

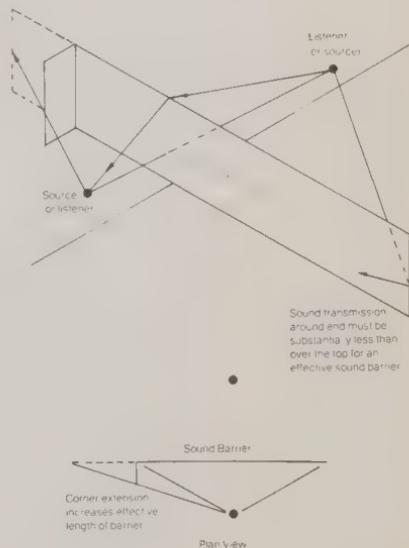
To illustrate the dimensions required of a barrier for 16 decibels of screening, the examples below may be used. (Source and listener positions are interchangeable).

Source Distance to Barrier	Listener Distance to Barrier	Projection Beyond Line of Sight
4 ft.	16 ft.	4 ft.
7 ft.	16 ft.	5 ft
16 ft.	16 ft.	6 ft

The projection beyond line of sight will be measured vertically in the case of a fence, or horizontally if the barrier is the corner of a house or the structure itself. With appropriate siting, where the homes themselves can be used as barriers, these dimensions are practicable. For sources and listeners having effective

elevations of, for example, 5 feet above ground (ear level), or higher for windows, the resulting height above grade of 9 feet or more may not be appropriate.

Figure 1  
Sound Barrier Concepts



\*STC wall + window = 31 dB. Attenuation through open window 15 dB. Additional attenuation required, 16 dB

\*\*Leo L. Beranek, *Noise and Vibration Control* (McGraw-Hill 1971), pp 282, 283

## 8. Conclusion

In conclusion, it appears that current mobile home developments have acoustical problems that are similar to those encountered in any normal residential development. The worst conditions, outdoor noise sources, and open windows, are identical in the two cases. When the windows are closed, the somewhat inferior isolation of the mobile home is of small consequence, and compensation can be obtained by increasing the distance between units, building sound barriers, or by imaginative choice of siting arrangements.

The fundamental construction of current mobile homes does not produce acoustical isolation performance that is significantly different from conventional wood-frame construction having some form of wood or metal exterior siding finish. (Of course, there are conventional on-site construction methods, such as solid masonry, or wood-frame with brick veneer, which are substantially better, acoustically).

The majority of acoustical privacy problems would be expected to arise from the placement of the outdoor area of one unit immediately adjacent to a window wall of a neighbour, or the close proximity, due to alignment, of the windows of independent dwellings.

The basic elements of construction of current mobile homes, and the attendant acoustical performance, in themselves are not indicative that special planning procedures are required. The data obtained from samples of current mobile homes show that unit to unit acoustical privacy would be quite good, even at close proximity, were it not for the sound transmission path provided by open windows.

It is the aspect ratio of outside dimensions, particularly in the case of single-wide units, and the attendant dis-

tribution of windows, as well as the interrelationship of outdoor areas to the windows of adjacent independent units, that are the major factors which determine the potential acoustical privacy level and which must be taken into account in the planning of mobile home developments to achieve the maximum potential sound isolation.

The measurements also indicate that, acoustically, there is no fundamental difference to be expected between single-wide and double-wide units.

The measured data also shows that earlier mobile homes were significantly poorer, in terms of sound isolation, than those now in production. It appears that, at least in some situations, the acoustical privacy provided by some of the older mobile homes would be grossly inadequate, even with windows closed.

It may also be, that in many cases, the sound problems encountered in mobile home developments are sociological, rather than acoustical.



## APPENDIX I

### Laboratory Measurement of Sound Transmission Loss of Mobile Home Exterior Wall

Test Report Prepared For:  
Valcoustics Canada Ltd.

By  
Cominco Ltd.  
Sheridan Park  
Mississauga, Ontario

May 17, 1977

# Sound Transmission Loss Characteristics of Two Mobile Home Wall Constructions

136

## I.1 Objectives

To establish the sound transmission loss values of two typical mobile home wall sections (with and without a window).

## I.2 Specimen Description

The test wall consisted of 2" x 4" wood framework (0.02 lb/in<sup>3</sup>) with the exception of the base plate which was 1" x 4" lumber. Studs (2" x 4") were located 16" o.c. except for one stud at 12" centres to make a total test width of 9 feet.

On the source room side the wood framework was covered with 1/4" thick aspenite (0.9 lb/ft<sup>2</sup>). The aspenite was then covered with .019" thick embossed profiled aluminum siding (0.29 lb/ft). The cavity created by the 2" x 4" framework was filled with R12 Fiberglas insulation, vapour barrier attached. The receiving room side of the wall was covered with 3/16" thick 0.56 lb/ft<sup>2</sup> mahogany veneer plywood. The wood panel faces were stapled in place over the top of B.F. Goodrich PL200 adhesive. The finished test partition was caulked on both sides with CGE acoustical sealant.

The second test wall consisted of a 31" wide by 41" high hole being cut in the middle of the above test specimen. Two by four inch base and header plates were added to the hole so that a complete frame was present for the attachment of the modular window. The Wickam aluminum window assembly measured 31" x 41" x 4" weighed 31 lb., and utilized 0.090" thick glass.

## I.3 Installation Details

The entire wood perimeter framework was coated with CGE acoustical sealant before being fastened into position. All standard practices, materials, fastening

methods, etc., generally used by the mobile home industry were utilized.

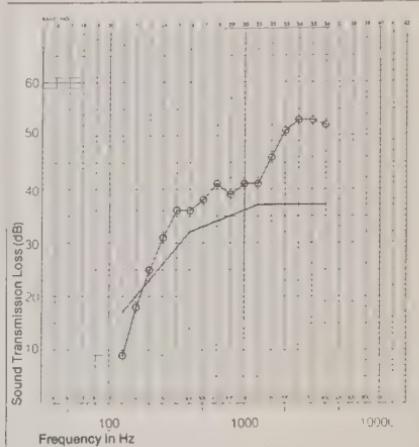
The test specimens were supplied and built by Norcom Homes Ltd. Mississauga, under the direction of R. J. Vahsholtz, Director of Planning.

## I.4 Testing Procedures

The completed 8 ft. high by 9 ft. high caulked test specimen (exterior face on the source room side) was tested for airborne sound transmission loss in accordance with the ASTM specification E90-70. The average of 6 runs at each of 16 test frequencies was used to determine the sound transmission loss. Additional measurements were made at certain frequencies (as required) to ensure that the required confidence limits were adhered to. The STC (sound transmission class) rating was derived as per ASTM method E413. All data reduction was performed by computer.

### Results

Test No.	Specimen	STC
TL-77-770	Norcom all wood mobile home test wall	33
TL-77-771	As above plus Wickam 31" x 41" window assembly	31



Test Data  
Sound Transmission Loss (dB) at 1/3 octave band centre frequency (Hz)

125	160	200	250	315	400	500	630
9	18	25	31	36	36	38	41
800	1000	1250	1600	2000	2500	3150	4000

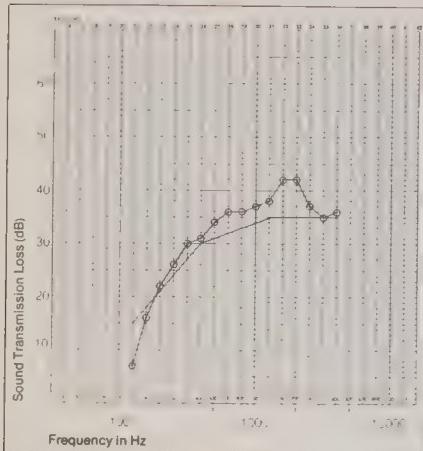
STC-33

### Sample description

Typical mobile home wall section which was comprised of a 2" x 4" wood framework 16" o.c., 3/16" mahogany veneer plywood one side, R12 insulation with vapour barrier in the cavity, a 1/4" aspenite with 0.019" aluminum on exterior face

Test conducted on an 8 ft. high by 9 ft. wide "caulked in place" assembly complete with all standard fittings in accordance with the ASTM specification E90-70

See accompanying report for further details



#### Test Data

Sound Transmission Loss (dB) at 1/3 octave band centre frequency (Hz).

125	160	200	250	315	400	500	630
7	16	22	26	30	31	34	36
800	1000	1250	1600	2000	2500	3150	4000
36	37	38	42	42	37	35	36

STC-31

#### Sample description

Same as test TL-77-770 but with a 31" x 41" x 4" Wickam aluminum window unit (0.990" glass) installed in the centre of the test wall with 2" x 4" framework completely around the perimeter.



## APPENDIX II

### Field Measurements of Interior/ Exterior Noise Reduction for Typical Recent Mobile Homes

# Field Measurements of Mobile Home Noise Reduction

140

## II.1 Introduction

The procedures followed were generally the same as those for the laboratory tests of Transmission Loss. However, these tests are non-standard, in large part because the test situations cannot be standardized. The samples were tested *in situ*, as typical installations. Therefore, the field results should be viewed only as indicators of expected typical performance.

## II.2 Test Method

Two loudspeakers were placed 10 feet apart, and 15 feet from the designated test surface of the mobile home and excited with random noise having a bandwidth of 2/3 of an octave.

The measurements of sound level inside and outside were made using a bandwidth of 1/3 of an octave at the same center frequency as the test noise signal. The indoor measurements were made about 5 ft. above the floor, one-third of the distance from a corner along a room diagonal. The outdoor measurements were made at a position 5 ft. above grade, 5 ft. from the wall, near its center.

## II.3 Test Samples

Sample 1 was a 1976 Norcom double-wide model installed over a full basement with concrete block walls extending about 2'-7" above grade. The basic construction is as described in Appendix I. The attic space was vented by means of perforated soffits at the ends of the unit.

The master bedroom was used. It measured 12'-0" x 14'-7 1/2" inside, was furnished in a typical fashion, and was broadloomed. This room had two exterior walls.

Sample 2 was similar to Sample 1 above, except that the unit was supported about 2 ft. above grade on piers and had a plywood skirt. The test room had broadloom floor finish, but was unfurnished.

Samples 1 and 2 were located in a mobile home development at Angers, Quebec.

Sample 3 was a Bendix, 3 bedroom single wide unit, mounted on concrete block piers and equipped with a skirt of Aspenite panels covered with siding. The attic space was vented by perforated soffits at each end. The side of the roof was vented by a small crack along the side trim.

The wall construction consisted of 1/4" paneling, 2" x 4" studs, 16" o.c., R12 insulation, 1/4" Aspenite, 0.019" aluminum siding.

The room under test was the end master bedroom having three exterior walls, one of which had a full width cupboard on the inside. The inside dimensions were 10'-6" x 14'-0". The (end) window was a double hung vertical slider, 30" x 62", equipped with "storms". The room was furnished in typical bedroom fashion. Sample 3 was installed in a mobile home development at Hoe Doe Valley near Barrie, Ontario.

## II.4 Results

Figures II-1 to II-3 show the measured field noise reduction results. The corresponding NIC values for each curve for the frequency range 125 Hz to 4000 Hz (inclusive) are:

	NIC
Sample 1	Blank Wall
	Window Wall
	Window Open 6"
Sample 2	Blank Wall
Sample 3	Blank Wall
	Window Wall

The results are also tabulated in Table II-1

It will be noted that in general, each curve rises to the right. That is, the sound isolation properties increase as a function of frequency. This is a property of all building materials. In some cases, there are "dips" in the NR (or TL) curves at localized frequency bands. This is usually due to some resonance phenomenon related to the construction of the system and the partition, etc., dimensions. This is also a normal phenomenon. The magnitude of the dip and its frequency band vary widely from configuration to configuration.

It is fortuitous that the human hearing mechanism is not equally sensitive to all frequencies. The sensitivity decreases significantly as the frequency is lowered. That is, at the low end of the frequency spectrum (say 125 Hz), much more sound energy is required to produce the same loudness effect as is required at, for example, 1000 Hz. Considering this relationship, the vast difference in sound isolation exhibited by partition systems at different ends of the audible spectrum is not as significant as it might seem.

The characteristics of the human hearing mechanism and the sound isolation behaviour of buildings systems, in terms of frequency or pitch, are complementary in general. It is a matter of whether the TL or NR curve is "high enough" to meet the requirements of the application.

The technique of computing the single number STC or NIC ratings incorporates weighting of the different frequency bands in an attempt to account for these characteristics of the ear.

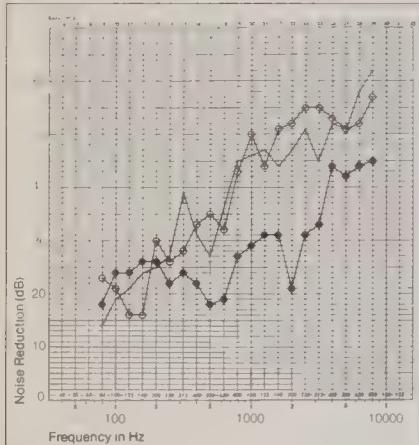


Figure II-1

## Mobile Home Noise Reduction Measurements

Sample 1 Double-wide, master bedroom, Norcom Lakehurst model at Angers, Quebec, full basement

— Window Wall NIC 35

○—○ Blank Wall, NIC 36

●—● Window Wall, window open 6 inches, NIC 25

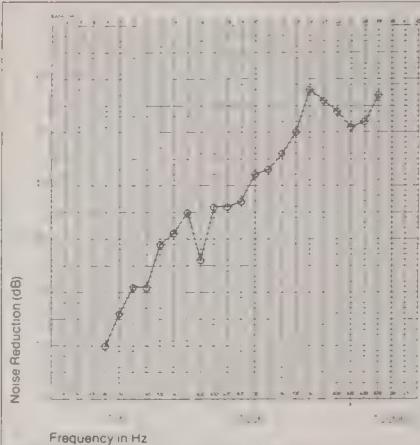


Figure II-2

## Mobile Home Noise Reduction Measurements

Sample 2 Double-wide, end bedroom, Norcom model at Angers Quebec, mounted on piers with plywood skirt

NIC 35

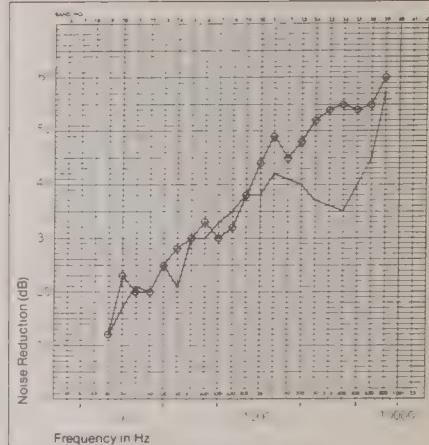


Figure II-3

## Mobile Home Noise Reduction Measurements

Sample 3 Single wide, master bedroom, Bendix model 77005 at Hoe Doe Valley, Ontario, mounted on concrete block piers, Aspenite and siding skirt

— Window Wall NIC 35

○—○ Blank Wall, NIC 37

Table II-1 Field Noise Reduction (NR) in dB

	1/3 Octave Band Center Frequency (Hz)															
	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000
Sample 1 Blank Wall	16	16	30	26	28	33	35	32	43	50	44	51	52	55	55	53
Sample 1 Window Wall	21	24	26	27	39	31	27	36	45	46	47	44	47	51	45	52
Sample 2 Blank Wall	21	21	29	31	35	26	36	36	42	43	46	50	59	56	54	
Sample 3 Blank Wall	2	20	25	28	30	31	30	32	38	44	49	45	48	52	54	55
Sample 3 Window Wall	21	20	25	21	30	30	34	35	38	38	42	41	40	37	36	35



## APPENDIX III

### Field Measurements of Interior/ Exterior Noise Reduction for Typical Older Mobile Homes

### III.1 Test Samples

Sample 4 was a small mobile home constructed in 1960. Its outside dimensions were 8 ft. x 27 ft. The inside was essentially one space with only partial dividers to designate living room, kitchen, bathroom, and bedroom spaces. The test wall had a single glazed window, about 3'-8" square, fitted with a storm window, spaced about one inch from the main glass. The top 10 inches was openable (but closed). Also present were a single glazed horizontal slider window, about 22 inches by 15 inches, and a kitchen exhaust fan, about 8 inches in diameter, with louvres closed. The unit was located in the Cedargrove development in Mississauga.

Sample 5 was a single-wide, measuring 12 ft. x 52 ft., built in the U.S. in 1968. The test wall was one side of the master bedroom which was at one end and was the full width. On each side wall, at the corner, was a window measuring about 3' x 3'-10". Three windows, of the same size were on the end wall; thus essentially spanning its full length. This extremely large amount of glazing probably accounts for the low NIC rating. This unit was located in the Cedargrove development in Mississauga.

Sample 6 was a 1972 single-wide Shelby model by Commodore. The test walls were a blank side wall and a side window wall of the living room, which spanned the full width (12 ft.) at one end of the unit. The end wall had an 8' x 4' bay window.

The window test wall contained two single glazed windows, measuring 3'-4" x 2'-6", and 3'-4" x 5'. The windows did not seal particularly well when closed.

### III.2 Results

The measured noise reduction and computed NIC results are shown in Figures III-1 to III-3. The test

methods and interpretations are as for the tests in Appendix II.

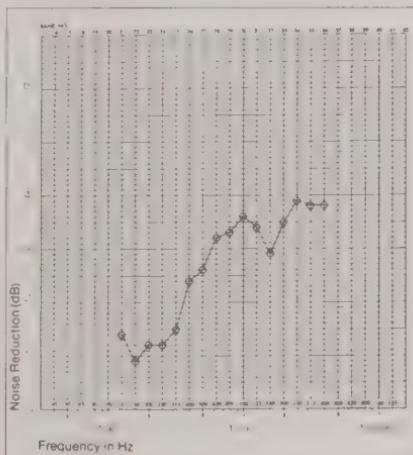


Figure III-1  
Mobile Home Noise Reduction Measurements  
Sample 4, 1960 Vintage, Cedargrove, Mississauga.  
NIC 27

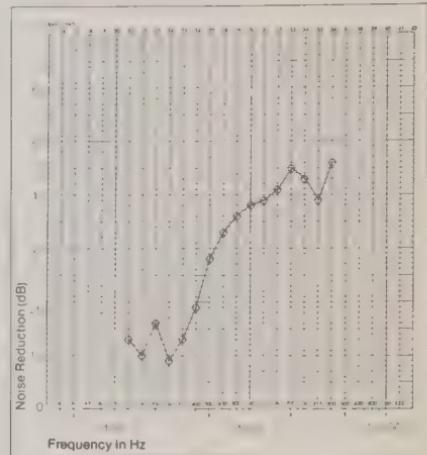


Figure III-2  
Mobile Home Noise Reduction Measurements  
Sample 5, 1968 Vintage (U.S.), Cedargrove, Mississauga  
NIC 24

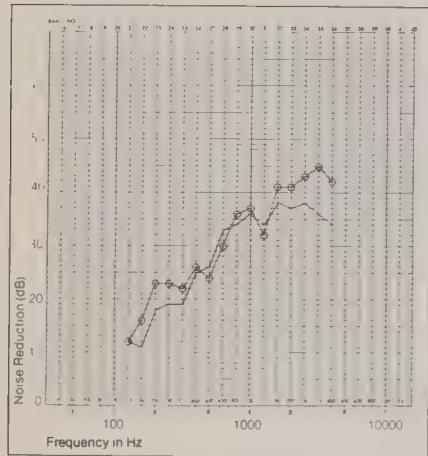


Figure III-3  
Mobile Home Noise Reduction Measurements  
Sample 6 1972 Vintage, Cedargrove, Mississauga

— Window Wall, NIC 26  
○—○ Blank Wall, NIC 31



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## Legend Part VI

project design site	■■■■■	neighbourhood commercial centre	▨▨▨▨
conventional housing	▨▨▨▨	neighbourhood collector roads	▬▬▬▬
neighbourhood park system	▨▨▨▨	arterial roads	▬▬▬▬
separate and public elementary schools	▨▨▨▨	local roads	▬▬▬▬
		farmlands	▨▨▨▨
		existing trees	▨▨▨▨

Legend for Parts I to V — see front cover flap

